Education of Iris (CLX-3160(F)N)

Digital Printing R&D 5 group

AUGUST, 2006

SAMSUNG DIGITall
everyone's invited™

Agenda

I. Outline

II. Composition & Function

III. Schematic

IV. Trouble shooting

Objectives

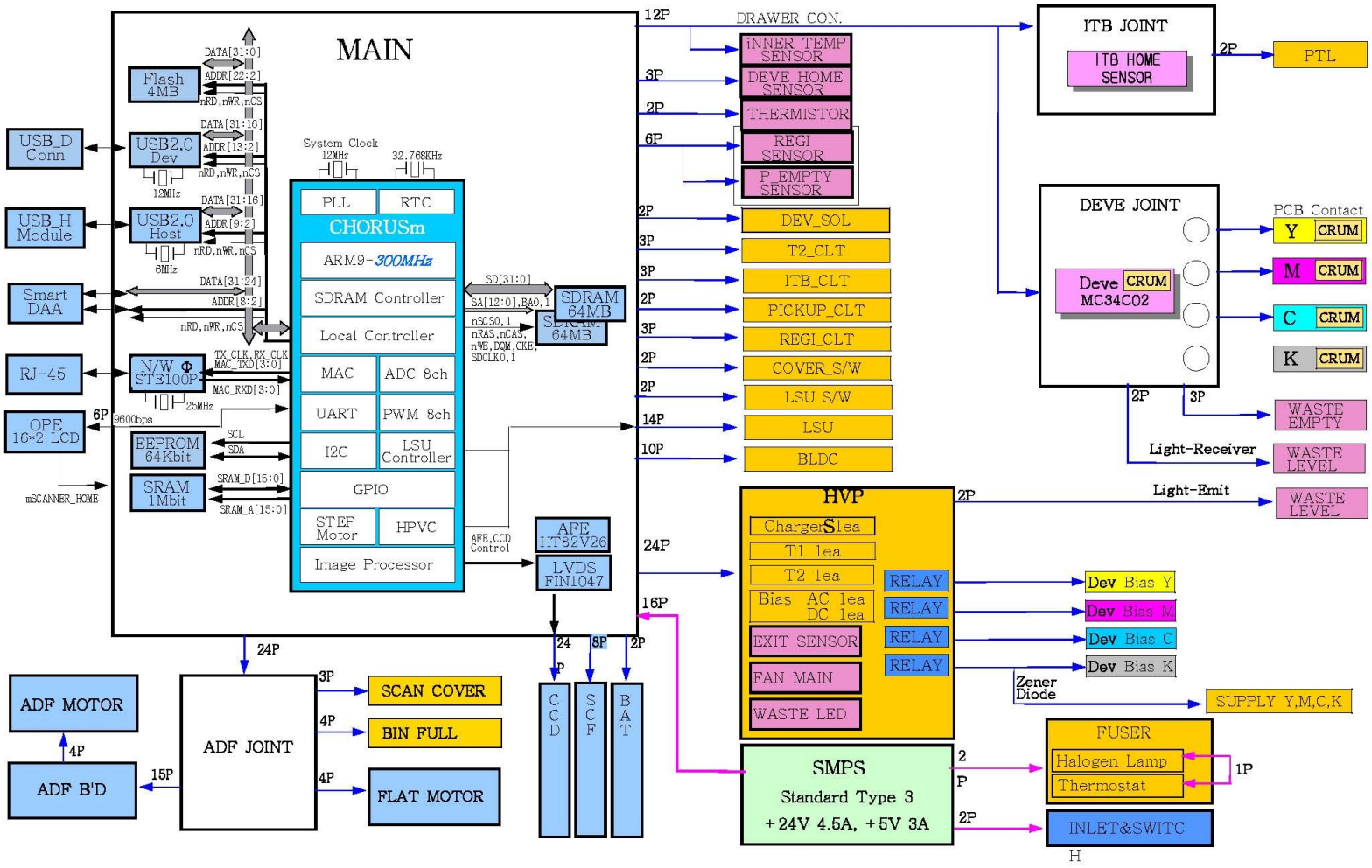
1. Understanding the basic structures and function of Hardware

2. Checking & building ability to Trouble Shooting

System Configuration

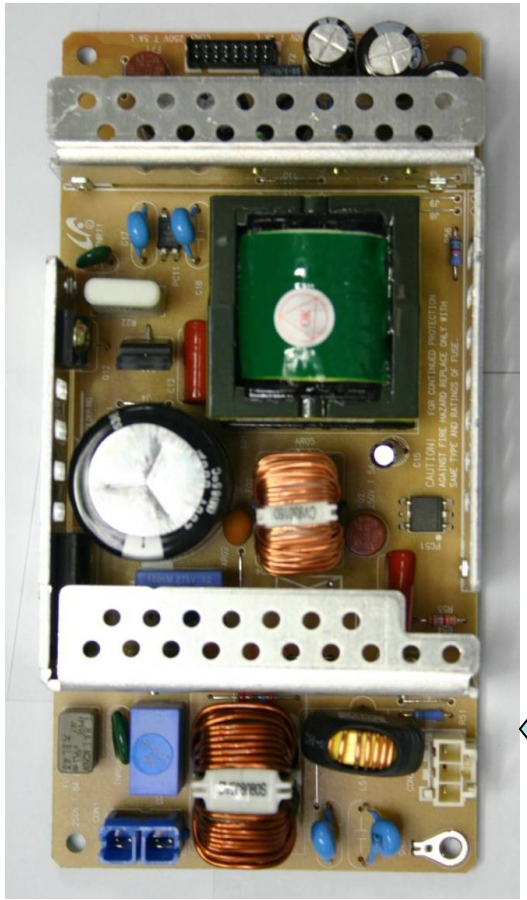
Model	CLX-3160N	CLP-3160FN	
Processor	Chorus M (SoC)	Chorus M(SoC)	
SDRAM:	128M	128M	
Flash ROM	4MB	4MB	
EEPROM	8KB(24C64)	8KB(24C64)	4K : N/W, 4K : System
Compatibility:	GDI(SPL-color)	GDI(SPL-color)	
Interfaces:	USB2.0 USB Host 1.1 LAN	USB2.0 USB Host1.1 LAN	Embedded N/W With MII
SCAN	Color CCD Optical 600X600	Color CCD Optical 600X600	Enhanced : 4800X4800 DPI
FAX	-	Smart DAA	
User Interfaces	LCD Panel	LCD Panel	

Block Diagram of CLX-3160 Series

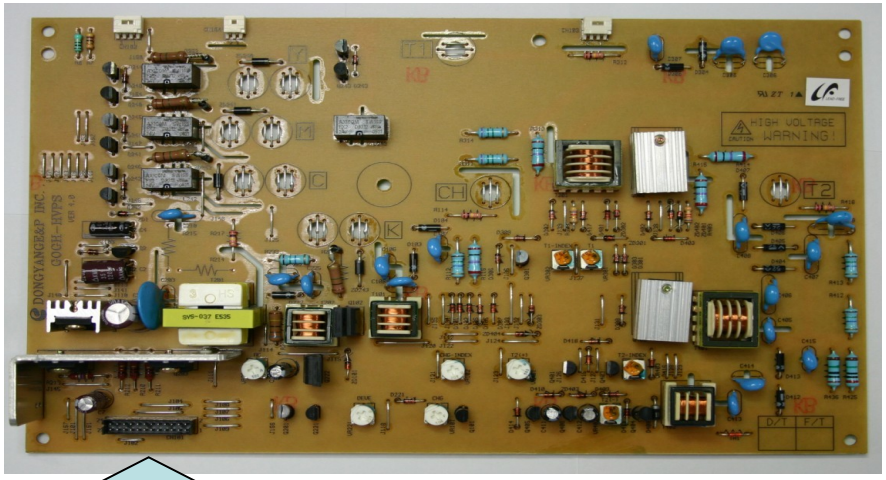


H/W Configuration (Engine & Controller)

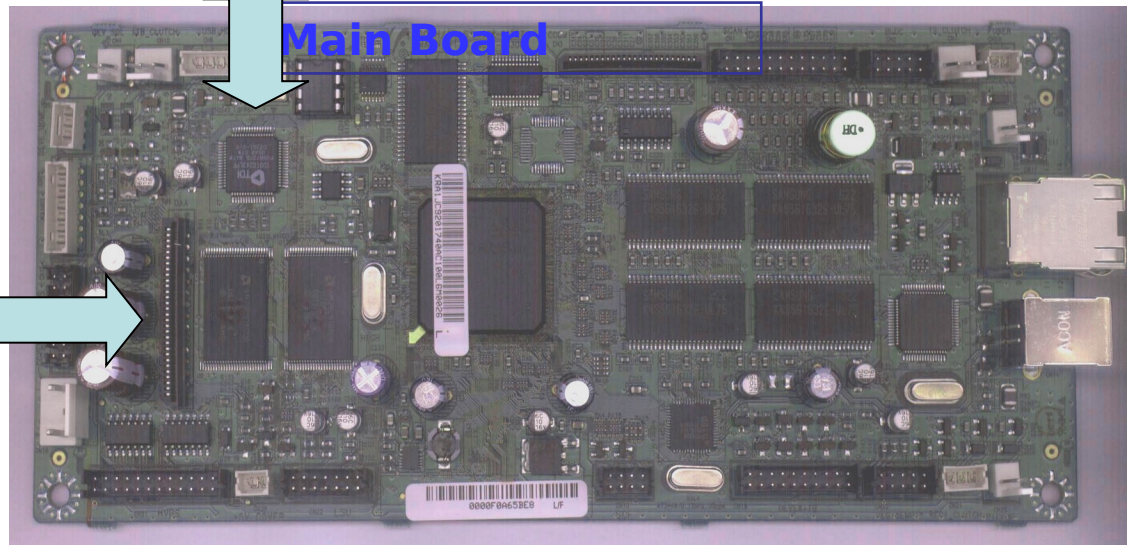
SMPS



HVPS



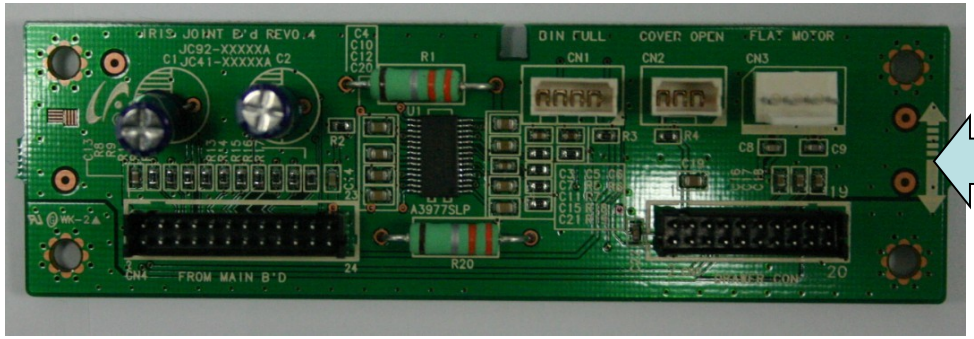
Main Board



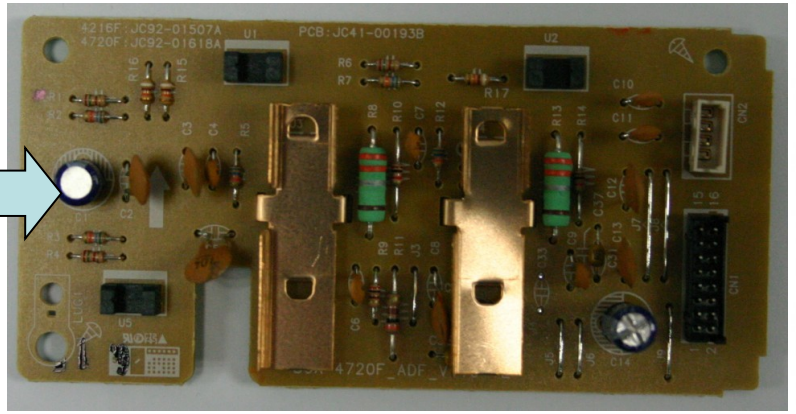
II. Composition & Function

H/W Configuration (SCAN & Pannel)

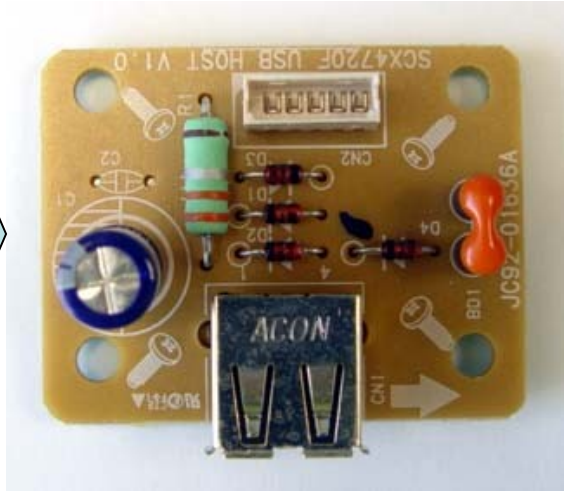
Flatten Joint



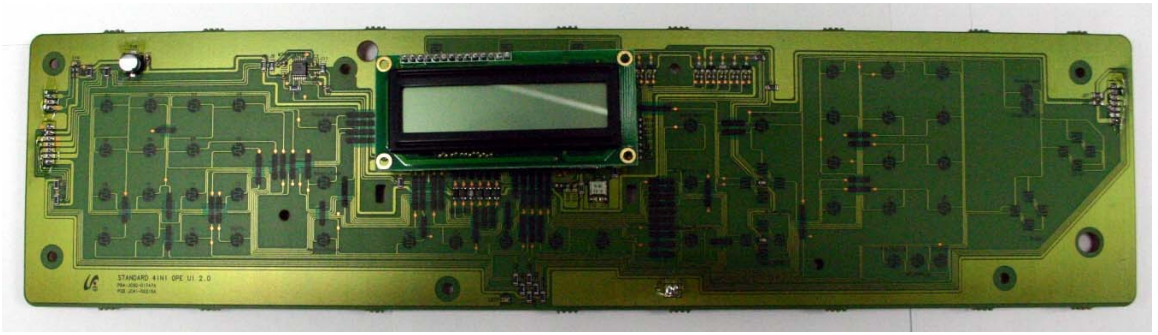
ADF



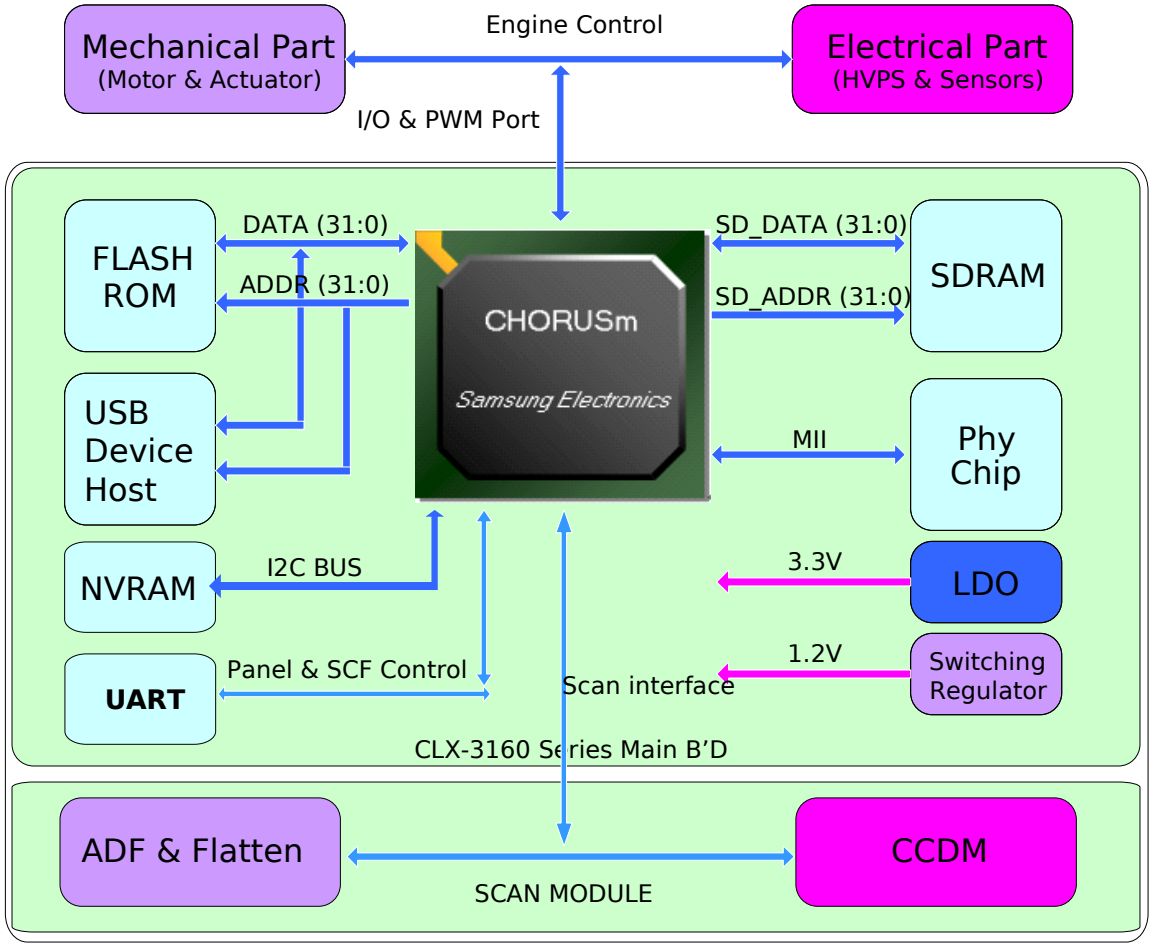
USB Host Joint



Pannel

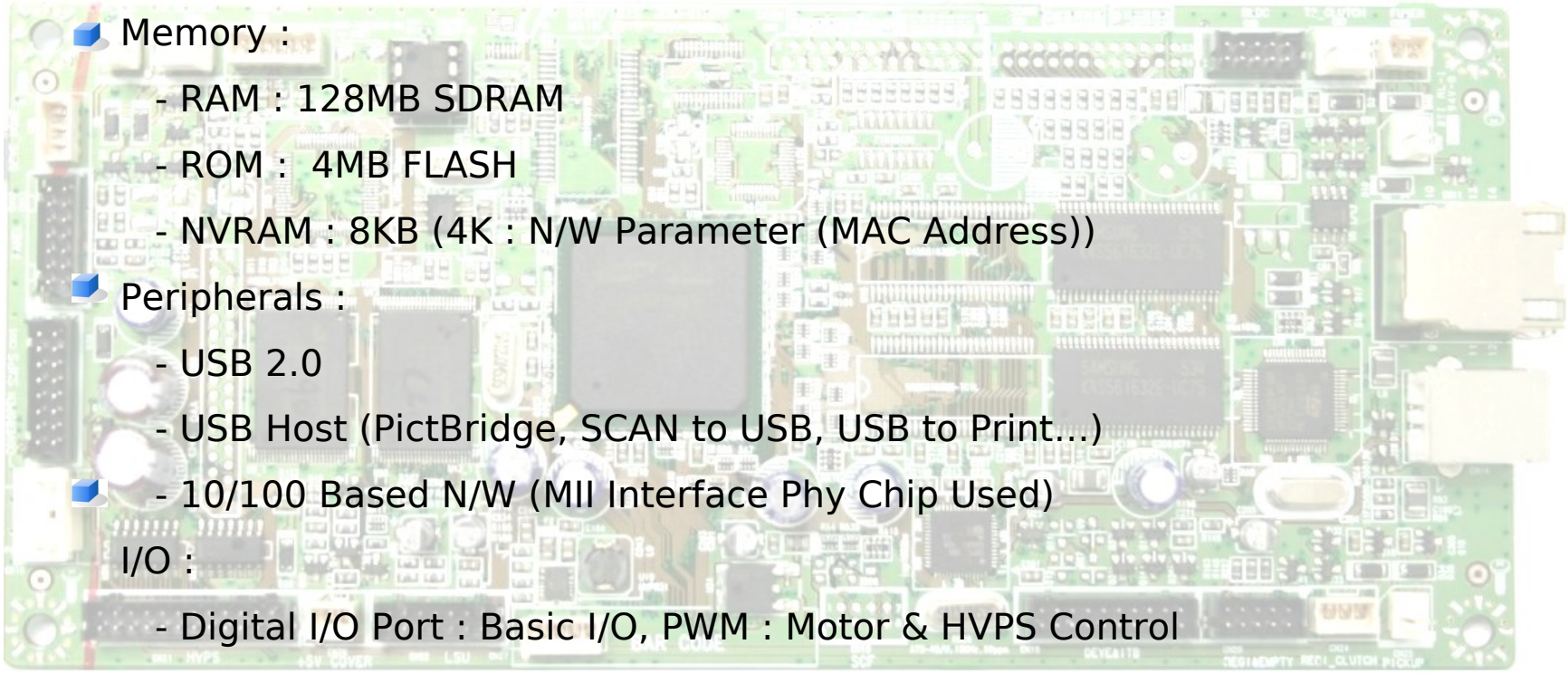


Main B'D Configuration



Main B'D Configuration (Con't)

- CPU : Chorus M (SoC)
- Memory :
  - RAM : 128MB SDRAM
  - ROM : 4MB FLASH
  - NVRAM : 8KB (4K : N/W Parameter (MAC Address))
- Peripherals :
  - USB 2.0
  - USB Host (PictBridge, SCAN to USB, USB to Print...)
  - 10/100 Based N/W (MII Interface Phy Chip Used)
- I/O :
  - Digital I/O Port : Basic I/O, PWM : Motor & HVPS Control
  - UART : SCF & Panel Communication, Debug
  - I²C : NVRAM & CRUM Interface (EEPROM : 24C64, 34C02)
  - Analog I/O Port (ADC : Sensor Interface, DAC : LD Power Control)



Chorus M Architecture

- CPU Core : ARM920 T 300Mhz (I-Cache : 16KB, D-Cache : 16KB)
- SDRAM Controller : 5 Bank, 100Mhz System Bus
- ROM Controller : 4 Banks (2 Bank Used)
- NAND FLASH Controller : 8/16 Bits interface (Not used)
- I/O Controller : 6 Banks
- DMA Controller : 6 Channel
- HPVC : Dual / Single Beam
- PVC : Dual / Single Beam (Not Used)
- UART : 5 Channels (Debug 1 Channel used only)
- Interrupt : 6 External, 26 Internal
- TIMER : 6 System Timer (S/W use Only)

Memory Interface

- **ROM :**
  - **- 4MB Nor Flash used**
  - **- Interface With Chorus M ROM Controller**
- **RAM :**
  - **- 128MB SDRAM**
  - **- Interface with Chorus M RAM Controller**
- **NVRAM :**
  - **- Size : 8KB**
  - **- Interface With Chorus M I2C Controller**
- **CRUM :**
  - **- Size : 256B**
  - **- Interface With Chorus M I2C Controller via Deve Joint B'D**

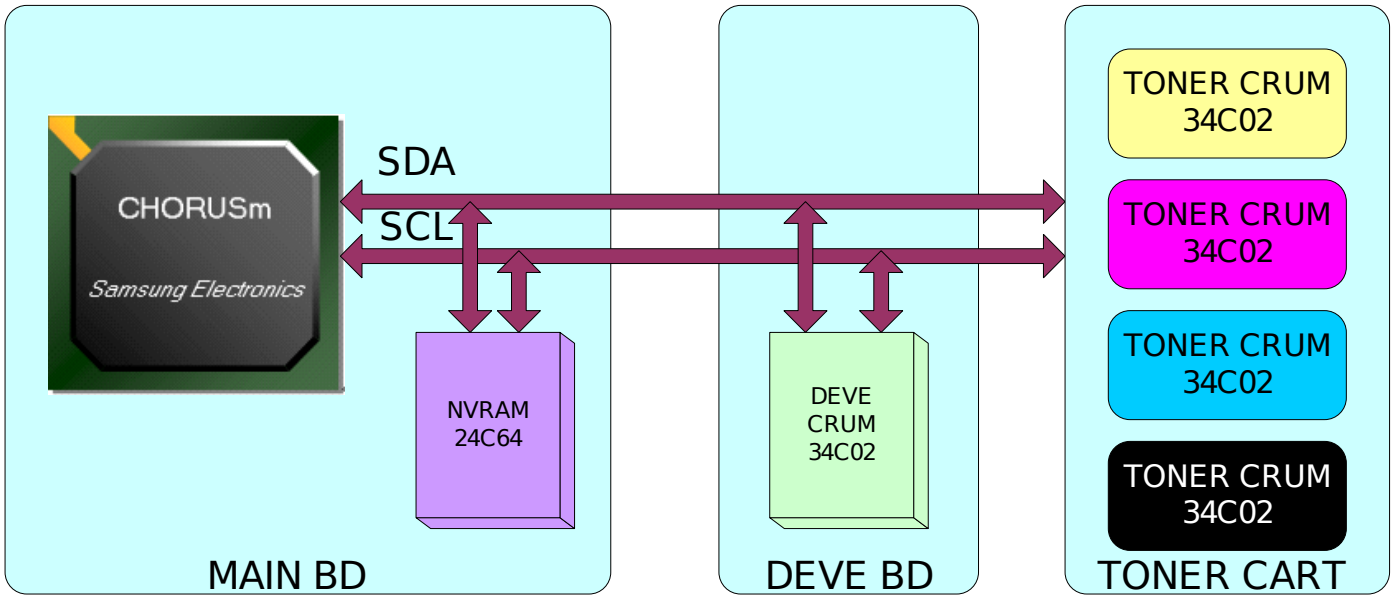
I/O Interface

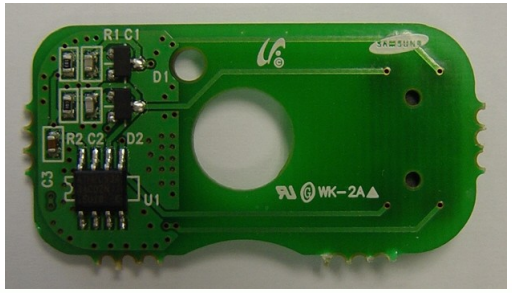
- **USB**
  - **- High Speed USB 2.0 Device**
  - **- USB Host (PictBridge)**
- **N/W Embedded**
  - **- Chorus M With MII Interface**
- **FAX**
  - **- Smart DAA**
- **PWM**
  - **- High Voltage Control With Duty**
  - **- Main Motor Clock**
- **I2C Interface**
  - **- NVRAM**
  - **- CRUM**

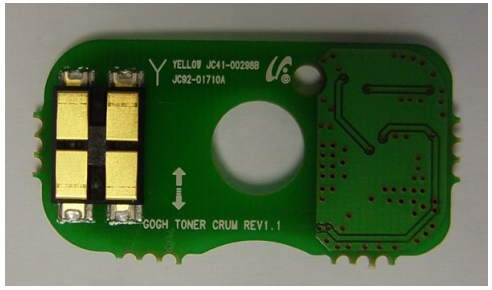
Power Flow

- **SMPS**
  - **Type III (Standard)**
  - **+24V : For use Mechanical Part (Motor & Actuator (Solenoid, Clutch))**
  - **+5V : Logic, Analog, Sensor,**
- **Main B'D**
  - **Supply From SMPS +5V**
  - **Power Supply with two Regulator (3.3V : LDO, 1.2V : Switching Regulator)**
  - **3.3V : I/O Operating (Digital & Analog)**
  - **1.2V : Chorus M Core Voltage**
- **HVPS**
  - **High Voltage Source for EP Condition**
  - **Supply From SMPS +24V**
  - **Controlled By PWM Pulse & I/O**

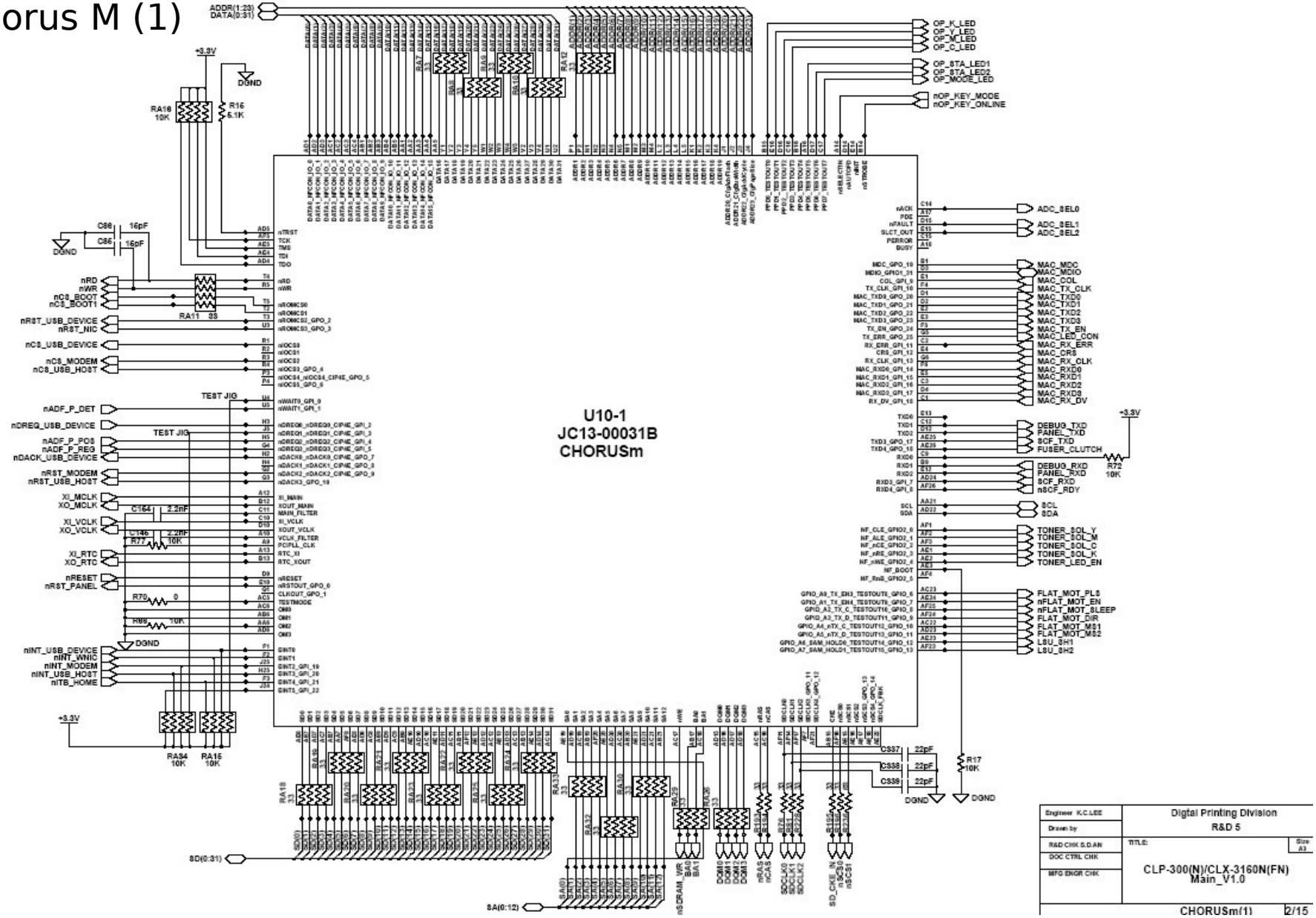
CRUM Interface



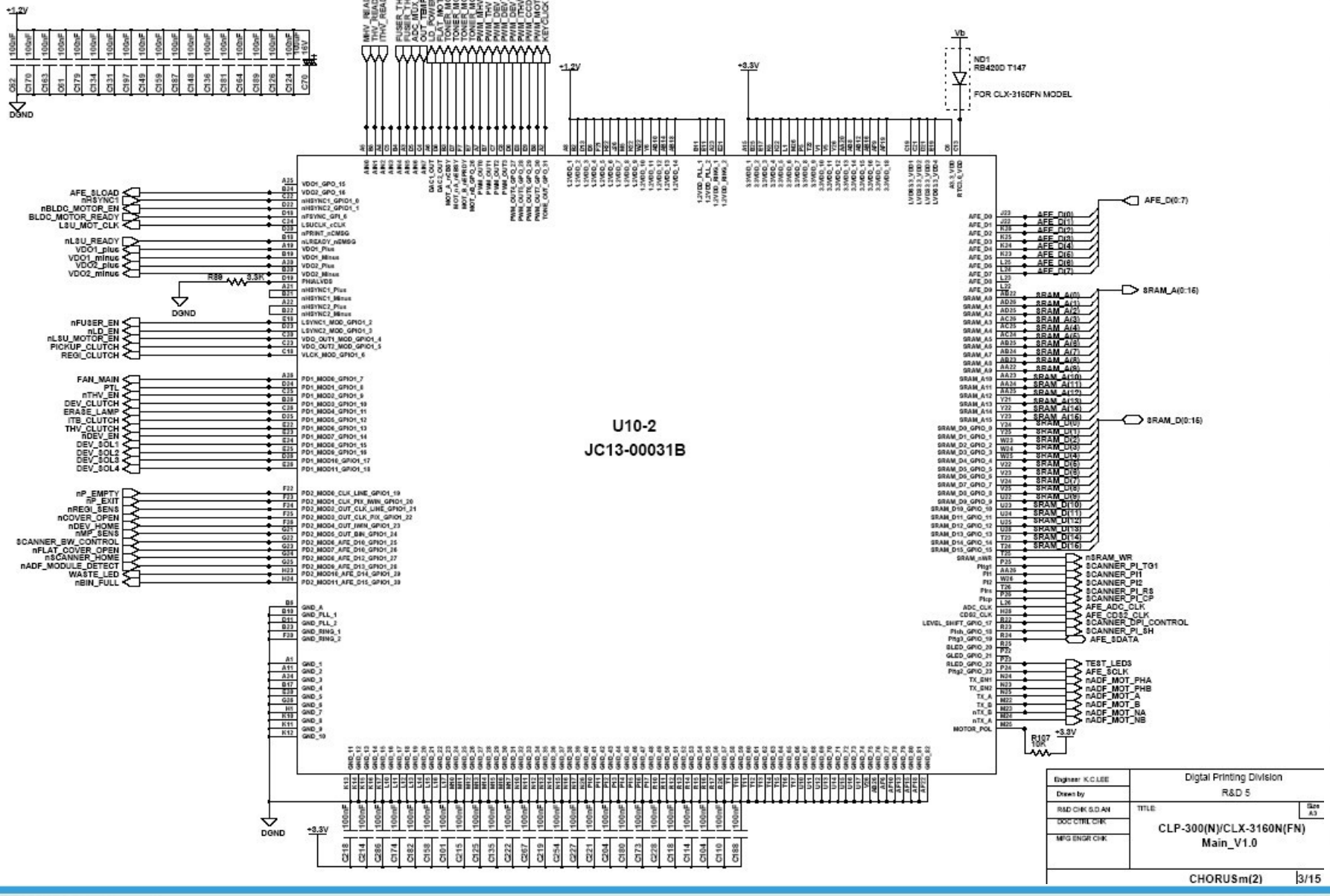




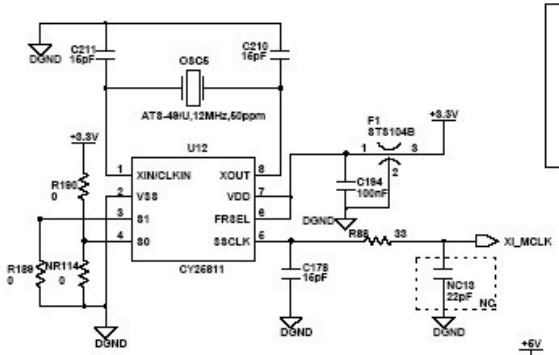
Chorus M (1)


U10-1
JC13-00031B
CHORUSm
ADDR(1:23)
DATA(0:31)
OP_K_LED
OP_Y_LED
OP_MCLED
OP_C_LED
OP_STA_LED1
OP_STA_LED2
OP_MODE_LED
nOP_KEY_MODE
nOP_KEY_ONLINE
ADC_SEL0
ADC_SEL1
ADC_SEL2
MAC_MDC
MAC_MDIO
MAC_COL
MAC_TX_CLK
MAC_TXD0
MAC_TXD1
MAC_TXD2
MAC_TXD3
MAC_TX_EN
MAC_LED_CON
MAC_RX_ERR
MAC_CRS
MAC_RX_CLK
MAC_RXD0
MAC_RXD1
MAC_RXD2
MAC_RXD3
MAC_RX_DV
DEBUG_TXD
PANEL_TXD
SCF_TXD
FUSER_CLUTCH
DEBUG_RXD
PANEL_RXD
SCF_RXD
nSCF_RDY
SCL
SDA
TONER_SOL_Y
TONER_SOL_M
TONER_SOL_C
TONER_SOL_K
TONER_LED_EN
FLAT_MOT_PLS
nFLAT_MOT_EN
nFLAT_MOT_SLEEP
FLAT_MOT_DIR
FLAT_MOT_MS1
FLAT_MOT_MS2
LSU_BH1
LSU_BH2
nRD
nWR
nCS_BOOT
nCS_BOOT1
nRST_USB_DEVICE
nRST_NIC
nCS_USB_DEVICE
nCS_MODEM
nCS_USB_HOST
nADF_P_DET
nDREQ_USB_DEVICE
nADF_P_POS
nADF_P_REG
nDACK_USB_DEVICE
nRST_MODEM
nRST_USB_HOST
XI_MCLK
XO_MCLK
XI_VCLK
XO_VCLK
XI_RTC
XO_RTC
nRESET
nRST_PANEL
nINT_USB_DEVICE
nINT_WNIC
nINT_MODEM
nINT_USB_HOST
nITB_HOME
SD(0:31)
SA(0:12)
+3.3V
DGND
TEST JIG
Engineer K.C.LEE
Drawn by
R&D CHK S.D.AN
DOC CTRL CHK
MFG ENGR CHK
Digital Printing Division
R&D 5
TITLE:
CLP-300(N)/CLX-3160N(FN)
Main_V1.0
CHORUSm(1)
2/15

Chorus M (2)

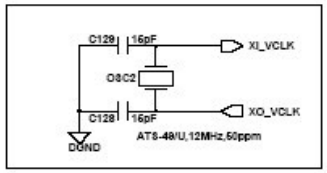

U10-2
JC13-00031B
Digital Printing Division
R&D 5
CLP-300(N)/CLX-3160N(FN)
Main_V1.0
CHORUSm(2)
3/15

Power & Clock

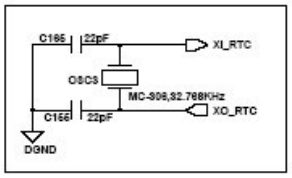


	S0	S1
0%	N.C	N.C
0.4%	0	N.C
0.8%	1	0
1.1%	N.C	0
1.3%	0	0

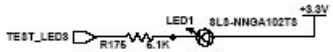
[SYSTEM CLOCK]

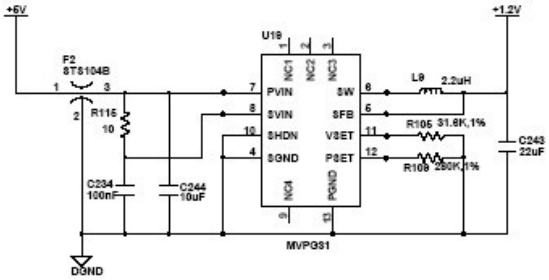


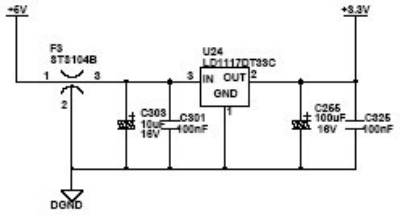
[VCLK]

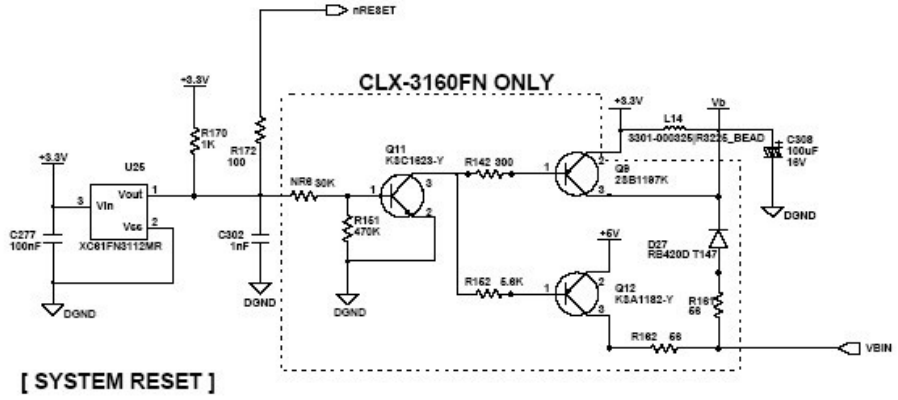


[RTC]









[SYSTEM RESET]

Regulator : 3.3V & 1.2V

Clock Source

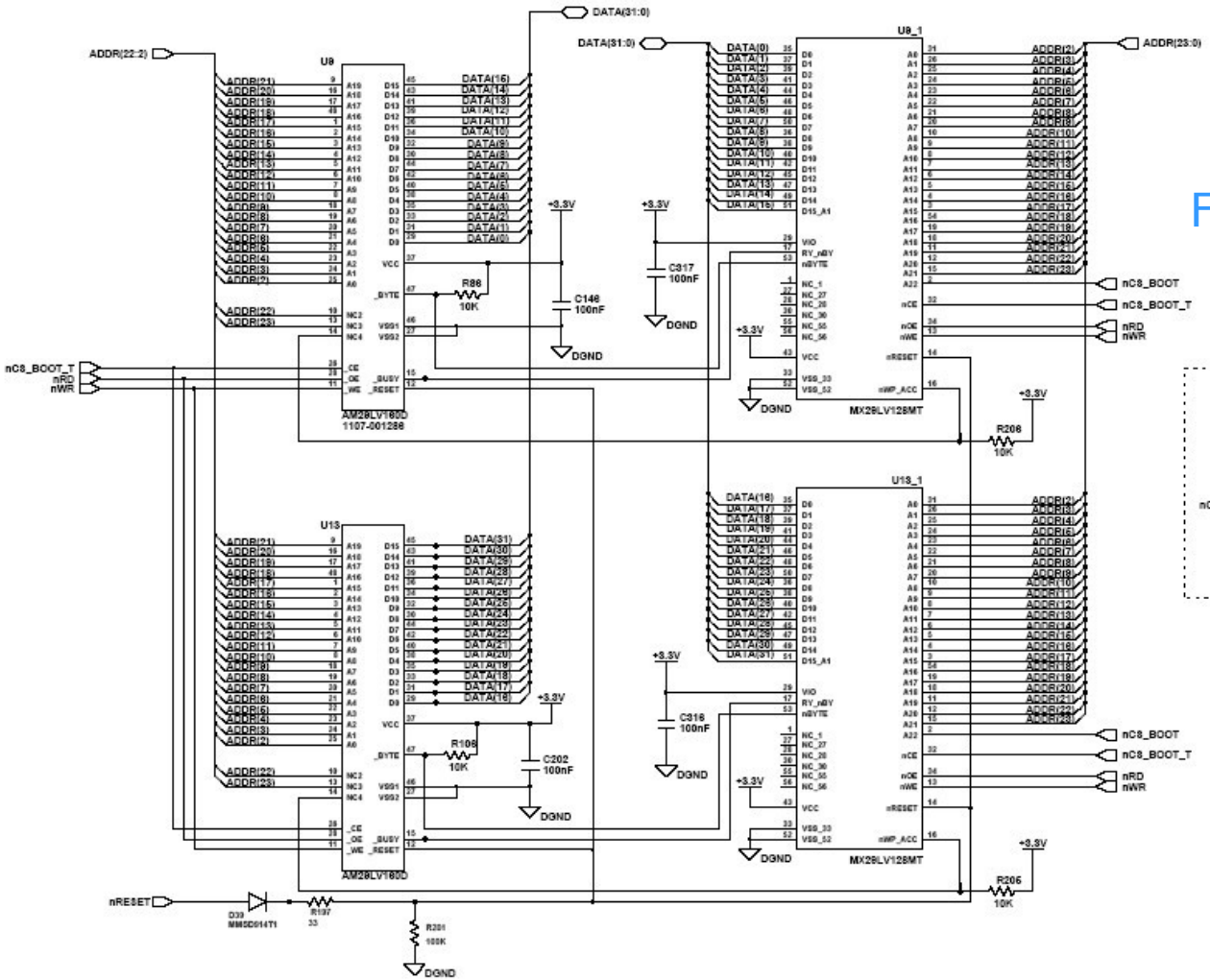
- Main : 12Mhz
- Video : 12Mhz

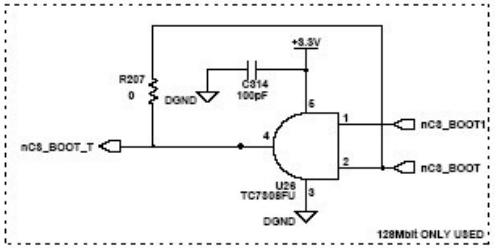
Engineer K.C.LEE	Digital Printing Division
Drawn by	R&D 5
R&D CHK S.D.AN	TITLE:
DOC CTRL CHK	CLP-300(N)/CLX-3160N(FN)
MFG ENGR CHK	Main_V1.0

Flash Memory

Model	Configuration	Size
CLP-300	8Mbit * 2 (1107-001302)	2MB
CLP-300N	16Mbit * 2 (1107-001286)	4MB
CLX-3160N CLX-3160FN	16Mbit * 2 (1107-001286)	4MB

Flash Memory Size



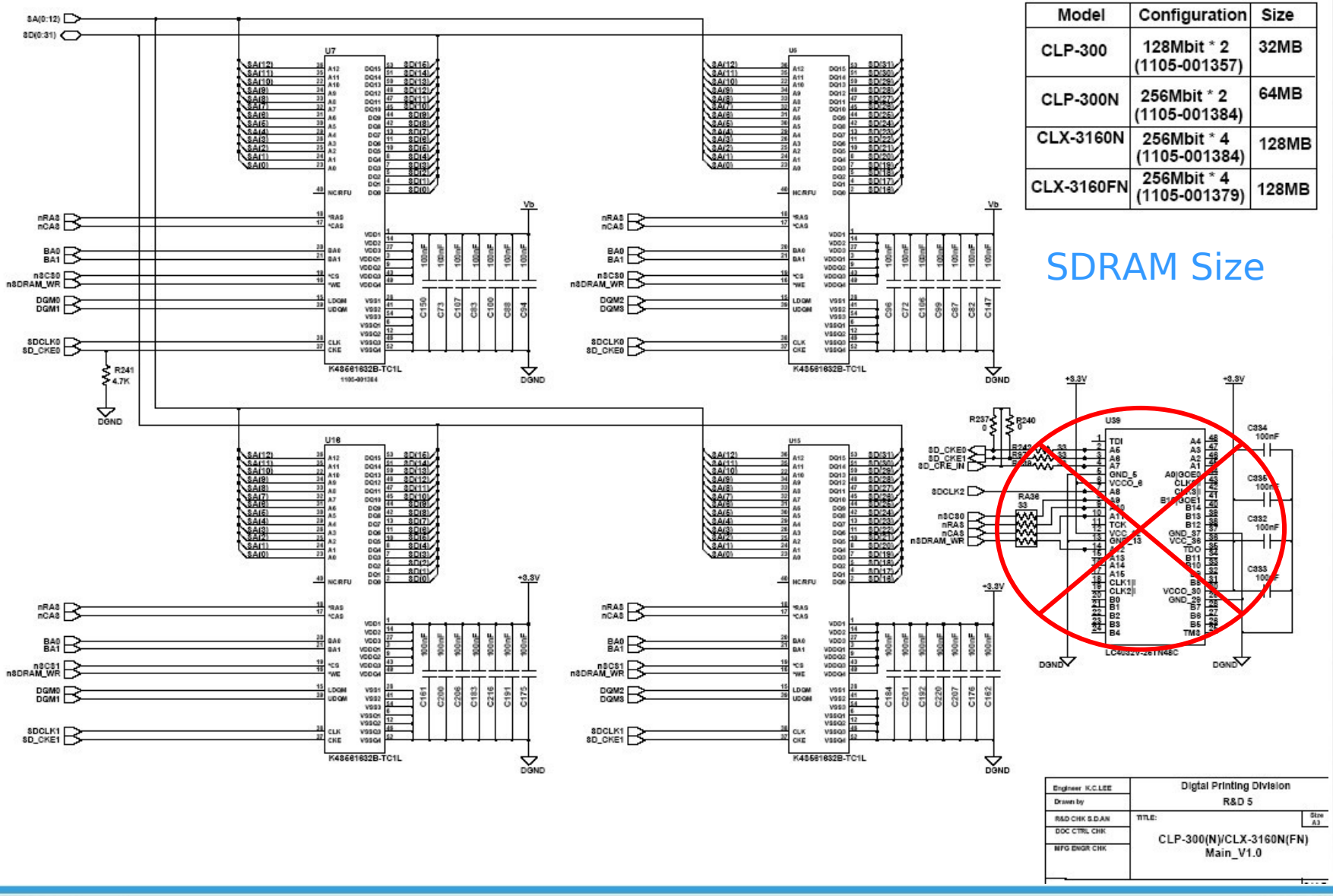


Engineer K.C.LEE	Digital Printing Division R&D 5	
Drawn by		
R&D CHK S.D.AN	TITLE:	Size A3
DOC CTRL CHK	CLP-300(N)/CLX-3160N(FN) Main_V1.0	
MFG ENGR CHK		
	Flash Memory	5/15

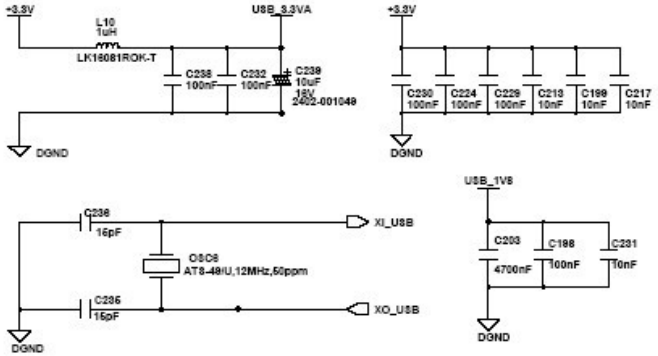
SDRAM

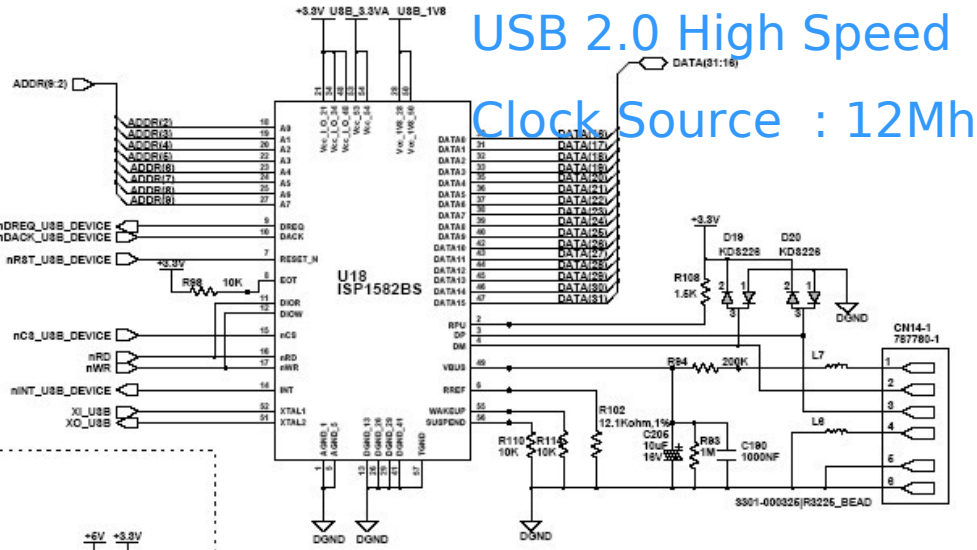
Model	Configuration	Size
CLP-300	128Mbit * 2 (1105-001357)	32MB
CLP-300N	256Mbit * 2 (1105-001384)	64MB
CLX-3160N	256Mbit * 4 (1105-001384)	128MB
CLX-3160FN	256Mbit * 4 (1105-001379)	128MB

SDRAM Size



USB Interface

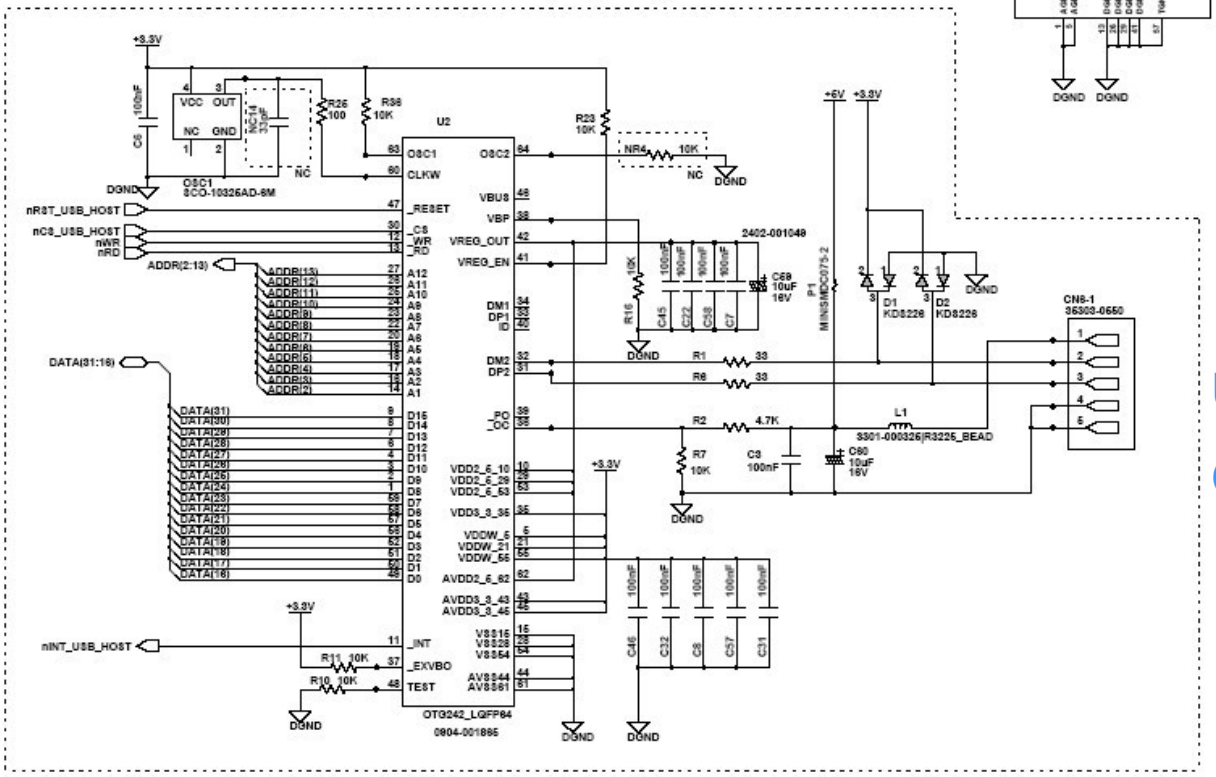




USB 2.0 High Speed

Clock Source : 12Mhz

CLX-3160N(FN) Only



USB 1.1

Clock Source : 6Mhz

Engineer K.C.LEE	Digital Printing Division
Drawn by	R&D 5
R&D CHK S.D.AN	TITLE: CLP-300(N)/CLX-3160N(FN) Main_V1.0
DOC CTRL CHK	
MFG ENGR CHK	

Embedded Network

CLP-300N & CLX-3160N(FN) Only

Embedded N/W (10/100M)

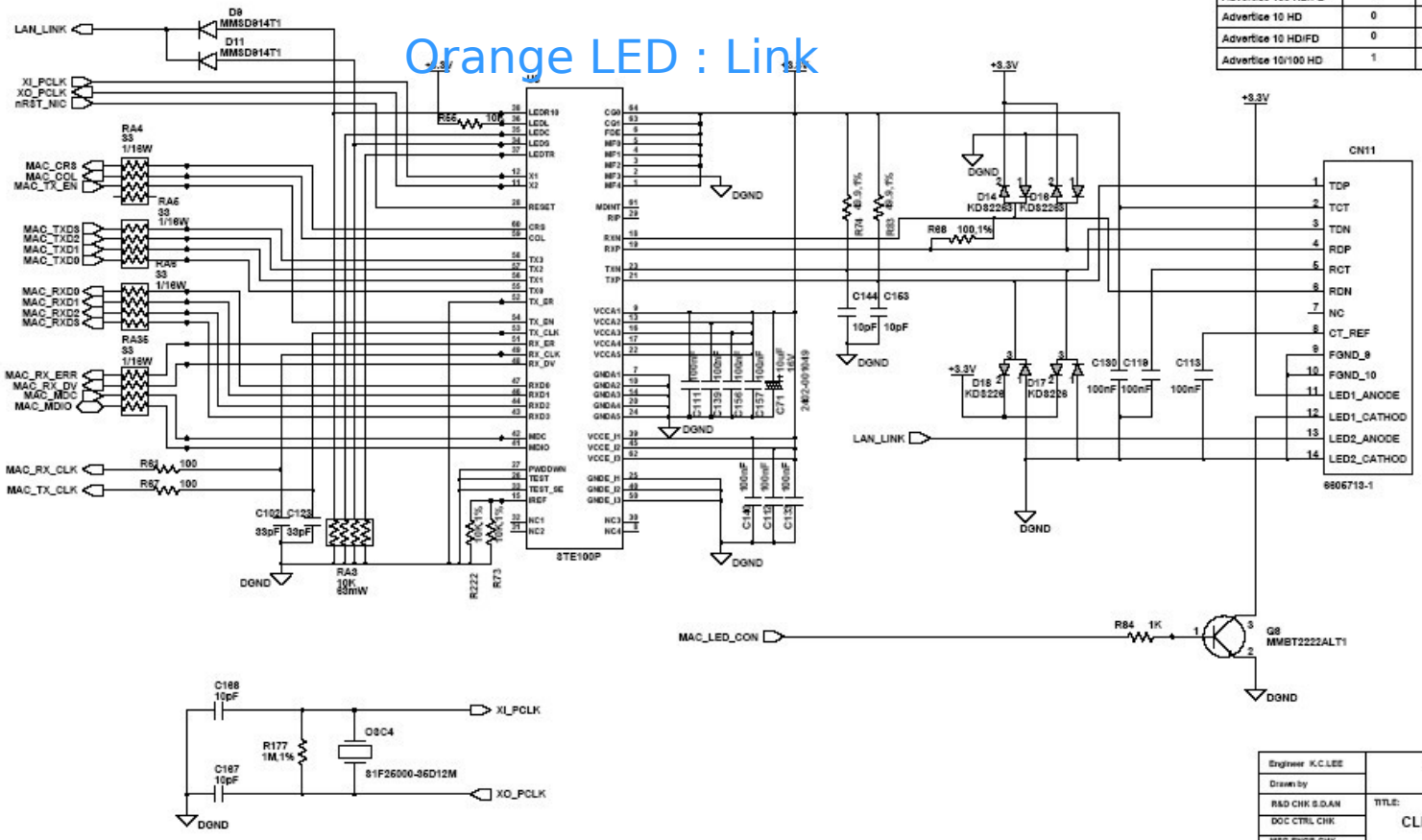
Green LED : Activity

Orange LED : Link

Pin	Function
mf0	Auto-Negotiation
mf1	Enable NRZ-NRZI conversion
mf2	4B/6B Coding Enable
mf3	Scrambler Operation Disable
mf4	MF4 10/100 Mbps Speed Select

Operating Configurations/ Auto-Negotiation Enabled

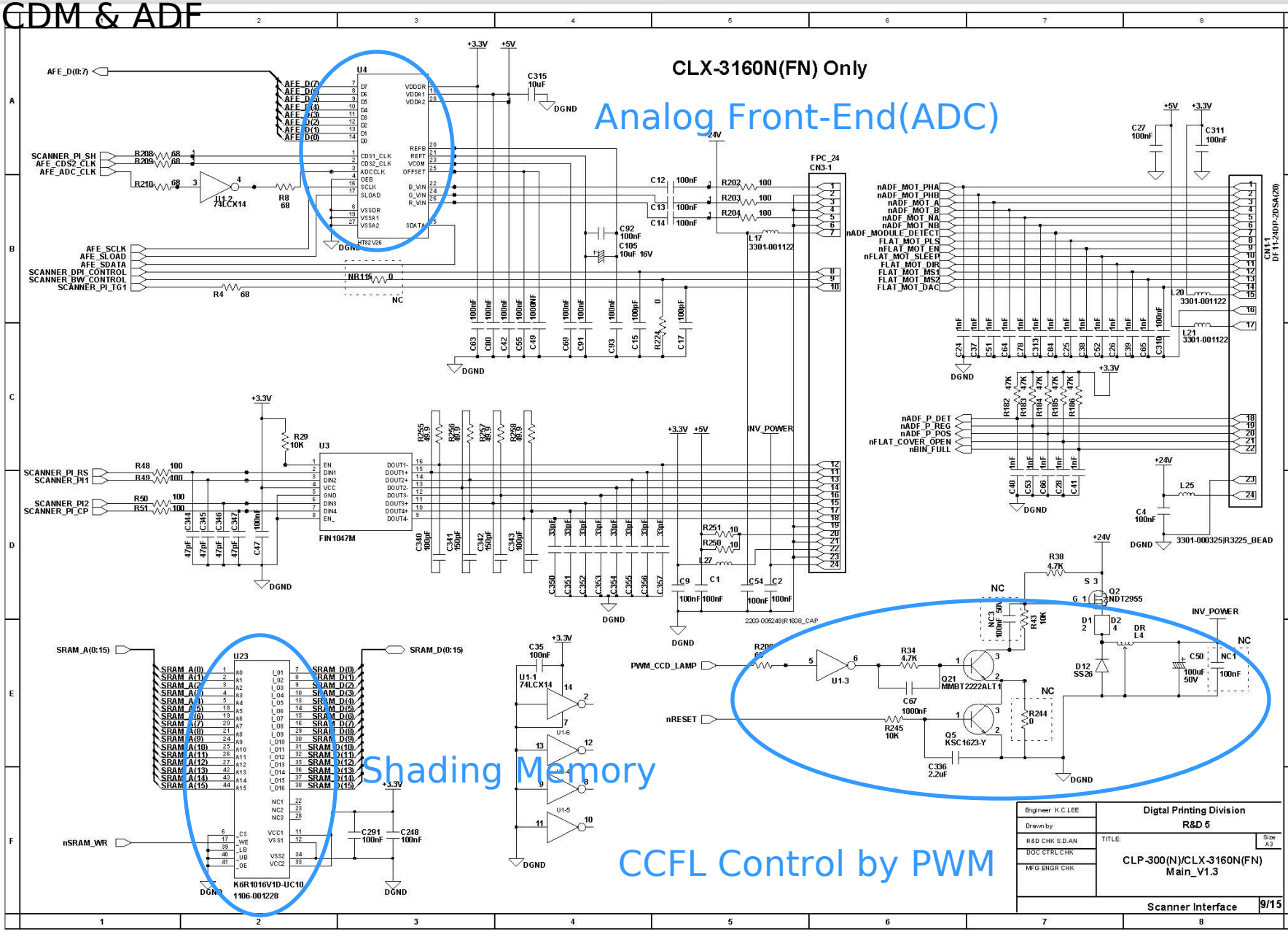
Desired Configuration	Input Value		
	CFG0	CFG1	FDE
Advertise All	1	1	1
Advertise 100 HD	1	0	0
Advertise 100 HD/FD	1	0	1
Advertise 10 HD	0	1	0
Advertise 10 HD/FD	0	1	1
Advertise 10/100 HD	1	1	0



Engineer K.C.LEE	Digital Printing Division
Drawn by	R&D 5
R&D CHK S.D.AN	TITLE: CLP-300(N)/CLX-3160N(FN) Main_V1.0
DOC CTRL CHK	Size A3
MFG ENGR CHK	

III. Schematic

CCDM & ADF



III. Schematic

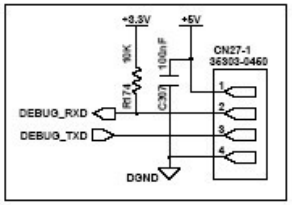
I2C & Panel Interface

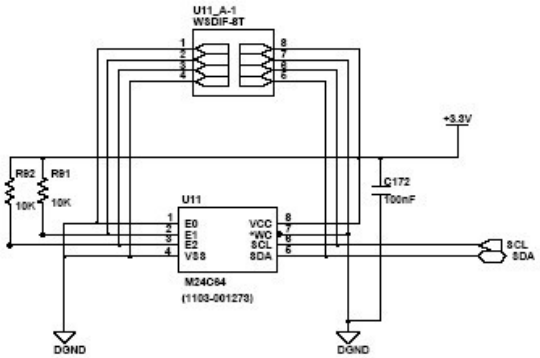
I2C Address Configuration

A2	A1	A0	I2C Address
0	0	0	Deve Y
0	0	1	Deve M
0	1	0	Deve C
0	1	1	Deve K
1	0	0	OPC
1	0	1	Not Used
1	1	0	NPC & NVRAM
1	1	1	Not Used

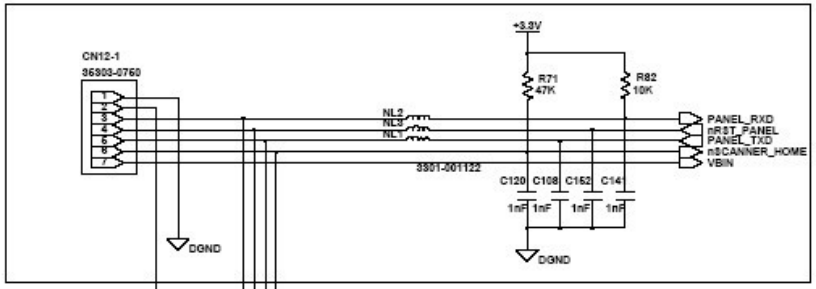
*I2C Address *

FOR DEBUG

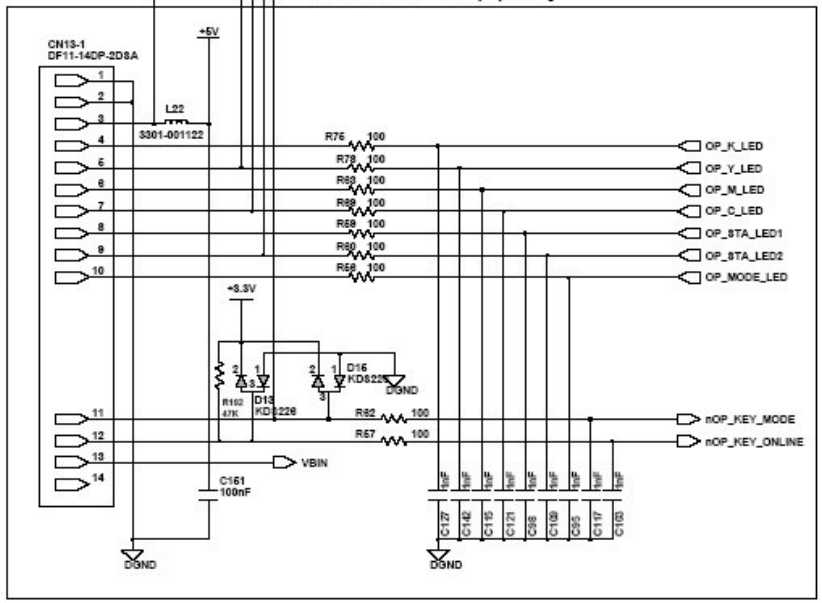




OPE2 : CLX-3160N(FN) Only

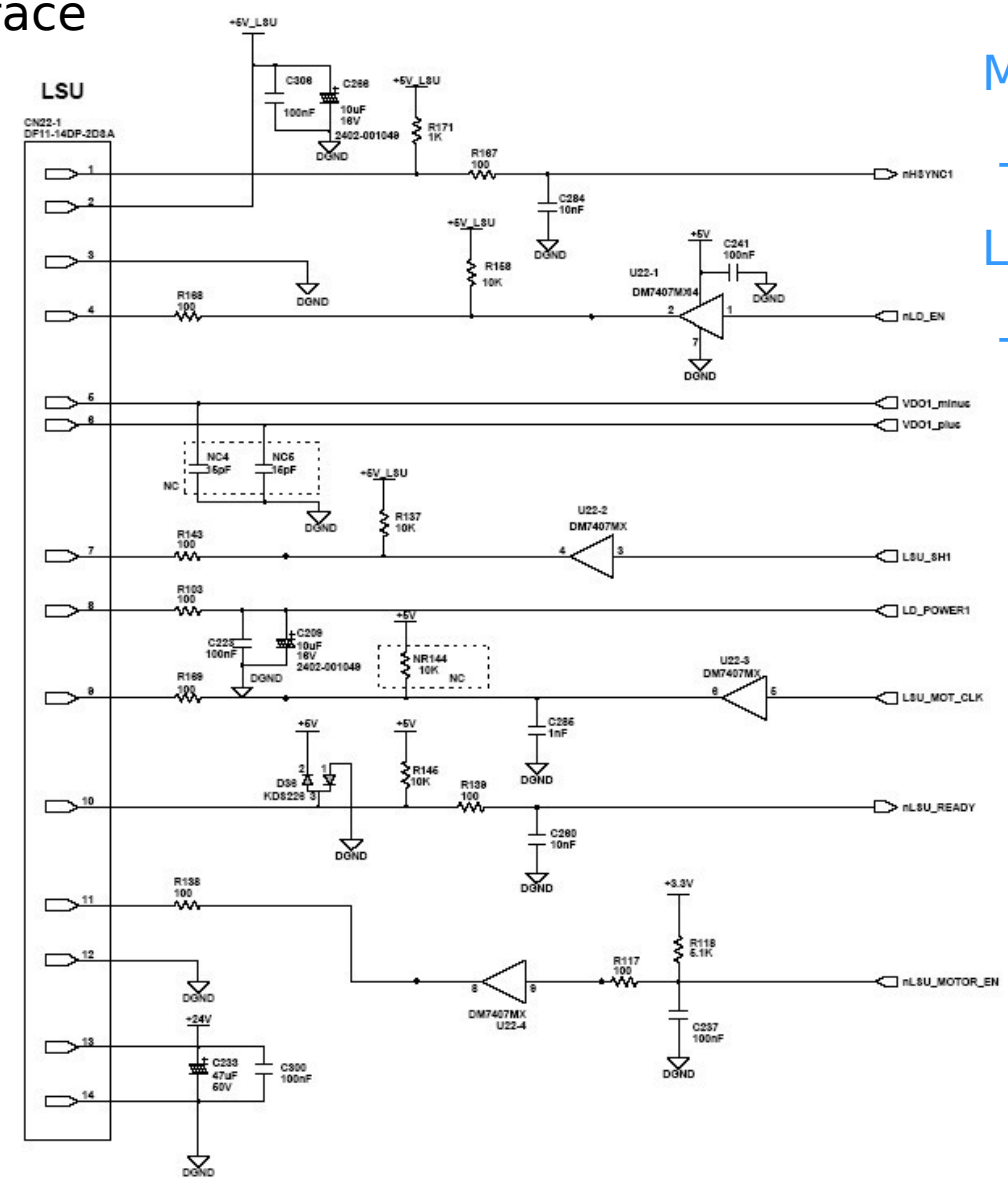


OPE1 : CLP-300(N) Only



Engineer K.C.LEE	Digital Printing Division
Drawn by	R&D 6
R&D CHK S.D.AN	TITLE: CLP-300(N)/CLX-3160N(FN) Main_V1.0
QDC CTRL CHK	
MFG ENGR CHK	
	Hyper Terminal, EEPROM, OPE 10/15

LSU Interface



Motor Control Signal

- Clock, Enable, Ready

LD Beam Control

- Video, S/H, Hsync

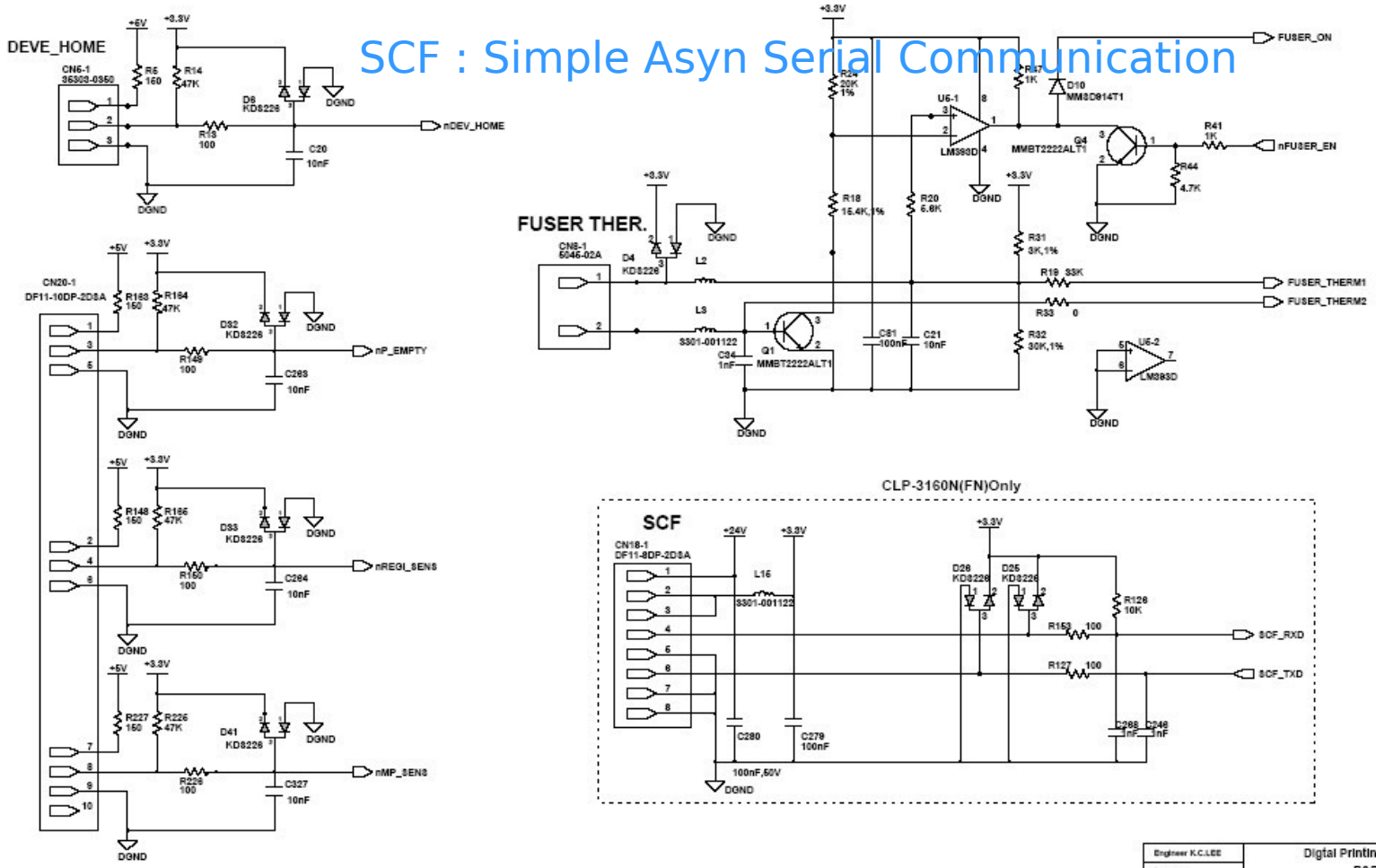
Engineer K.C.LEE	Digital Printing Division
Drawn by	R&D 5
R&D CHK S.D.AN	TITLE: CLP-300(N)/CLX-3160N(FN) Main_V1.0
DOC CTRL CHK	
MFG ENGR CHK	

Sensor & Fuser Circuit

Sensor : Photo Interrupt

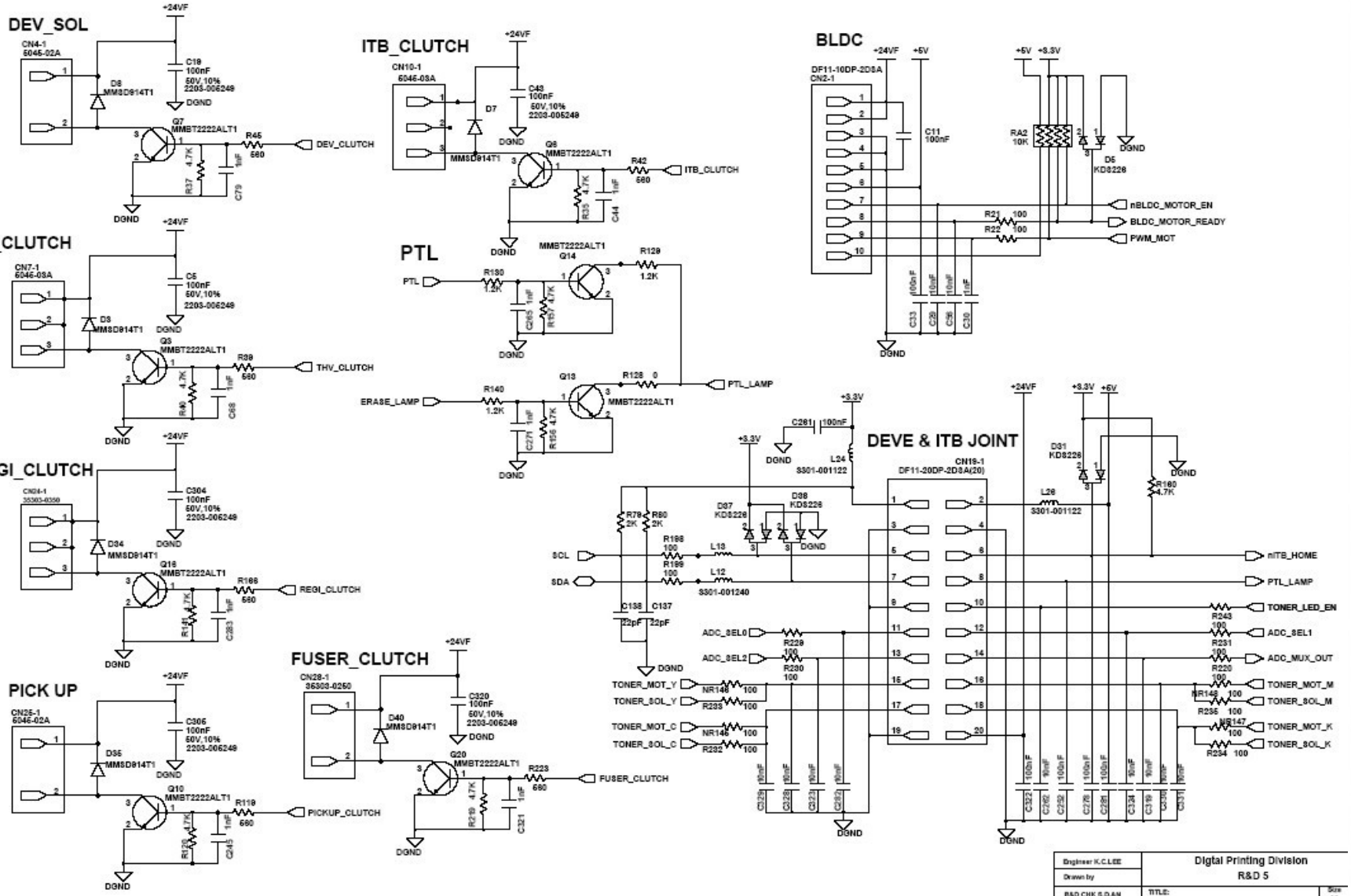
Fuser : Linearization & Protection

SCF : Simple Asyn Serial Communication



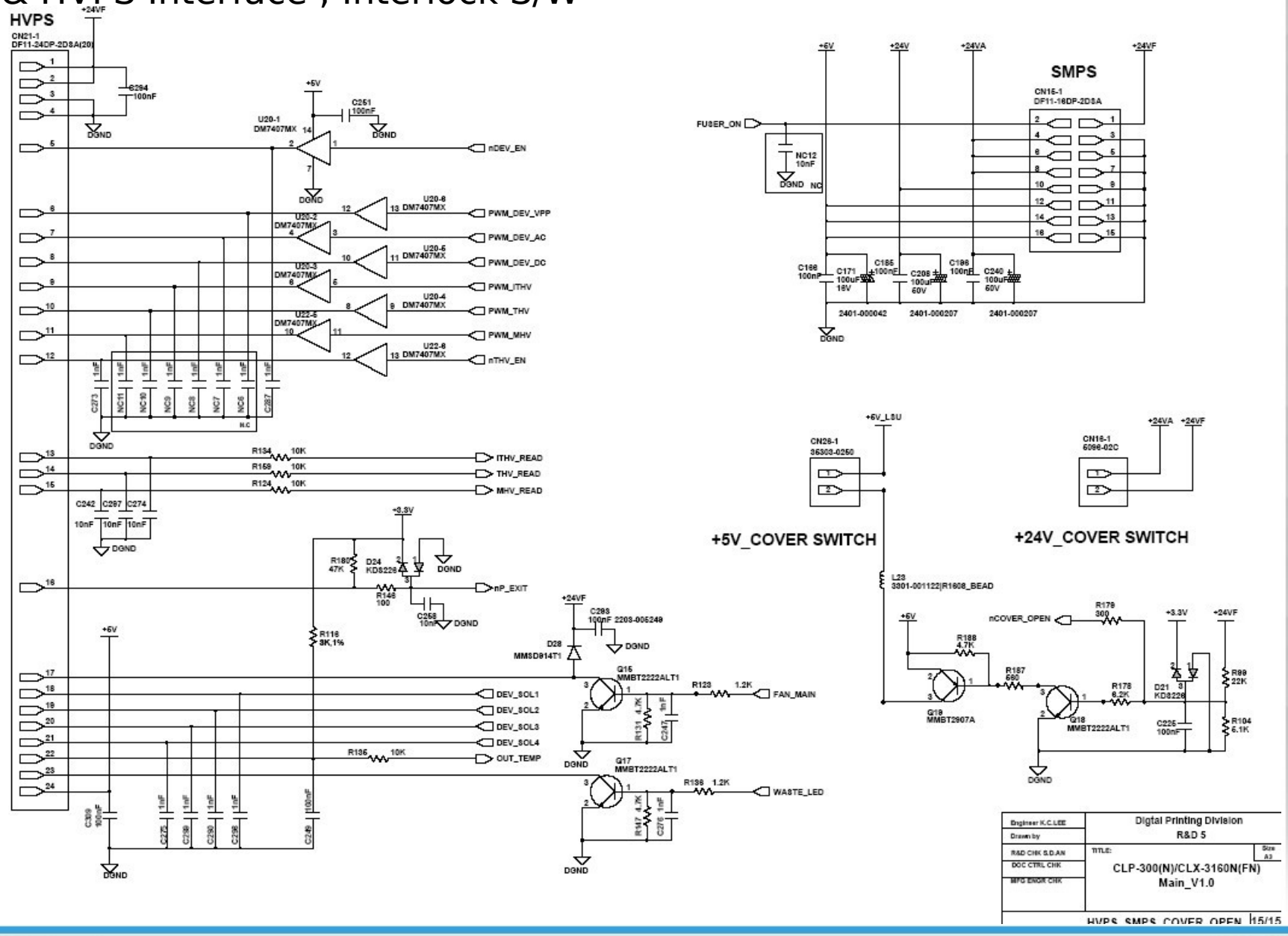
Engineer K.C.LEE	Digital Printing Division
Drawn by	R&D 5
R&D CHK S.D.AN	TITLE:
DOC CTRL CHK	CLP-300(N)/CLX-3160N(FN) Main_V1.0
MFG ENGR CHK	
	DEVE_HOME,SCF,FUSER THER 13/15

Actuator Driving & Interface Circuit



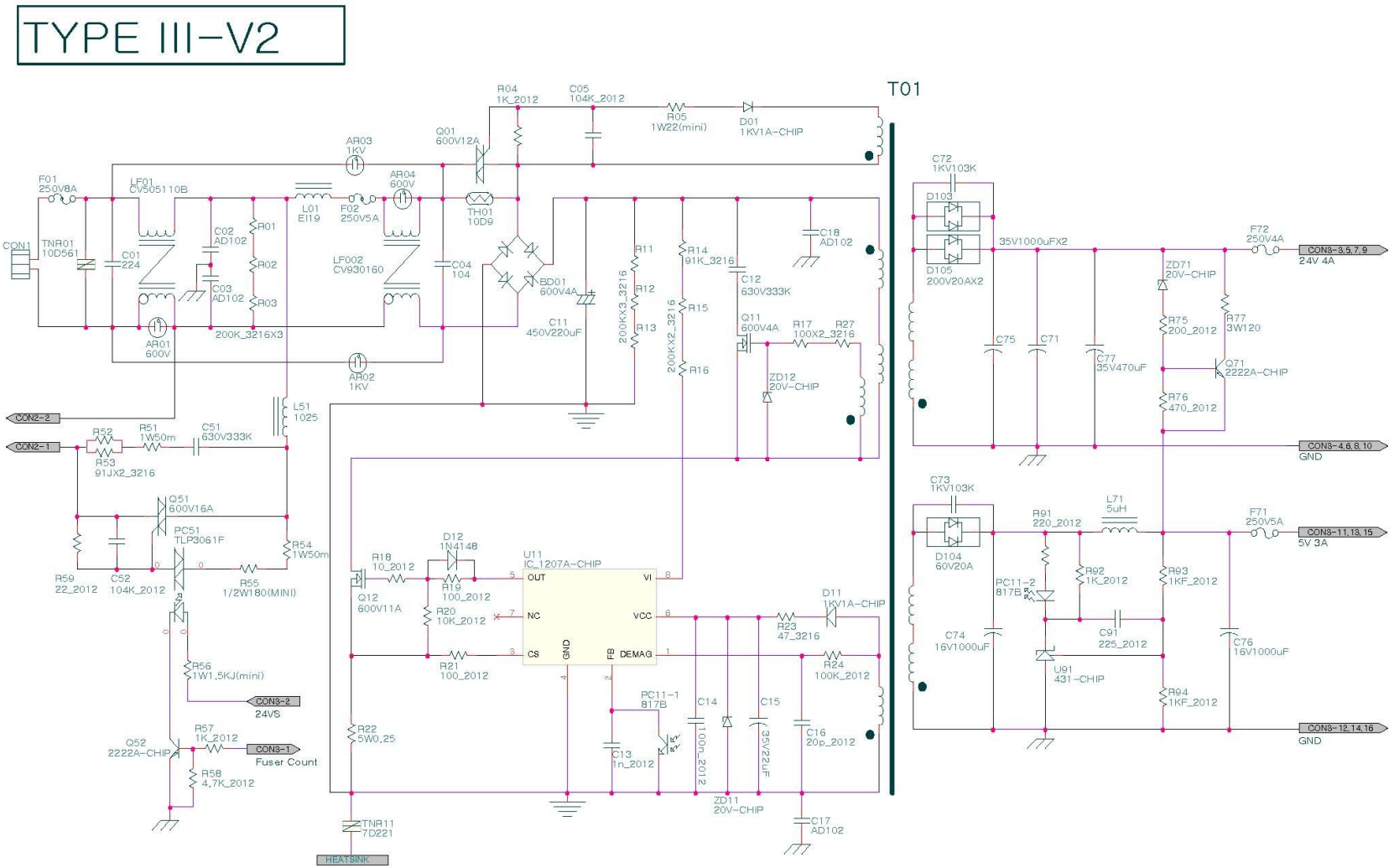
III. Schematic

SMPS & HVPS Interface , Interlock S/W



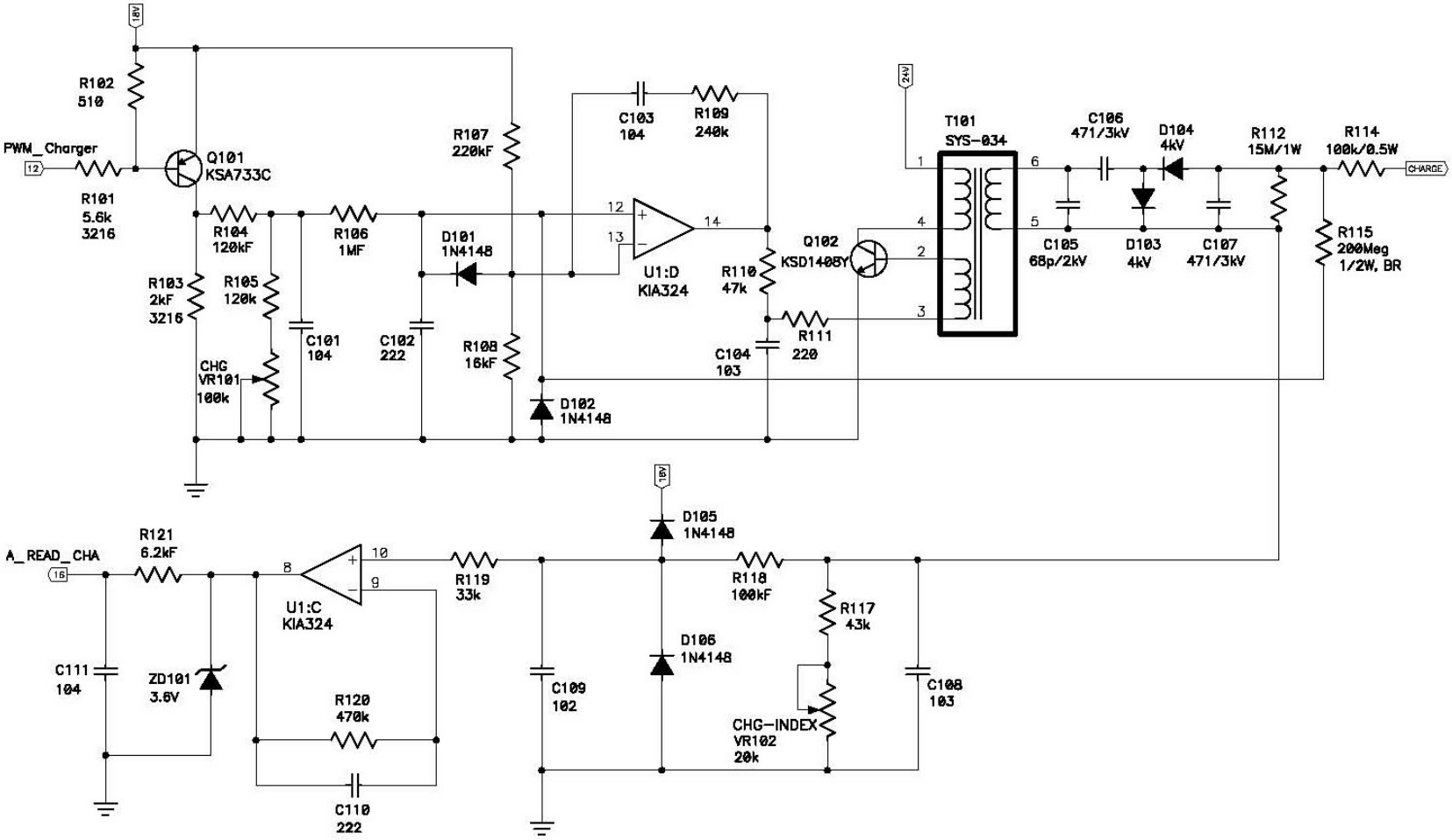
III. Schematic

SMPS



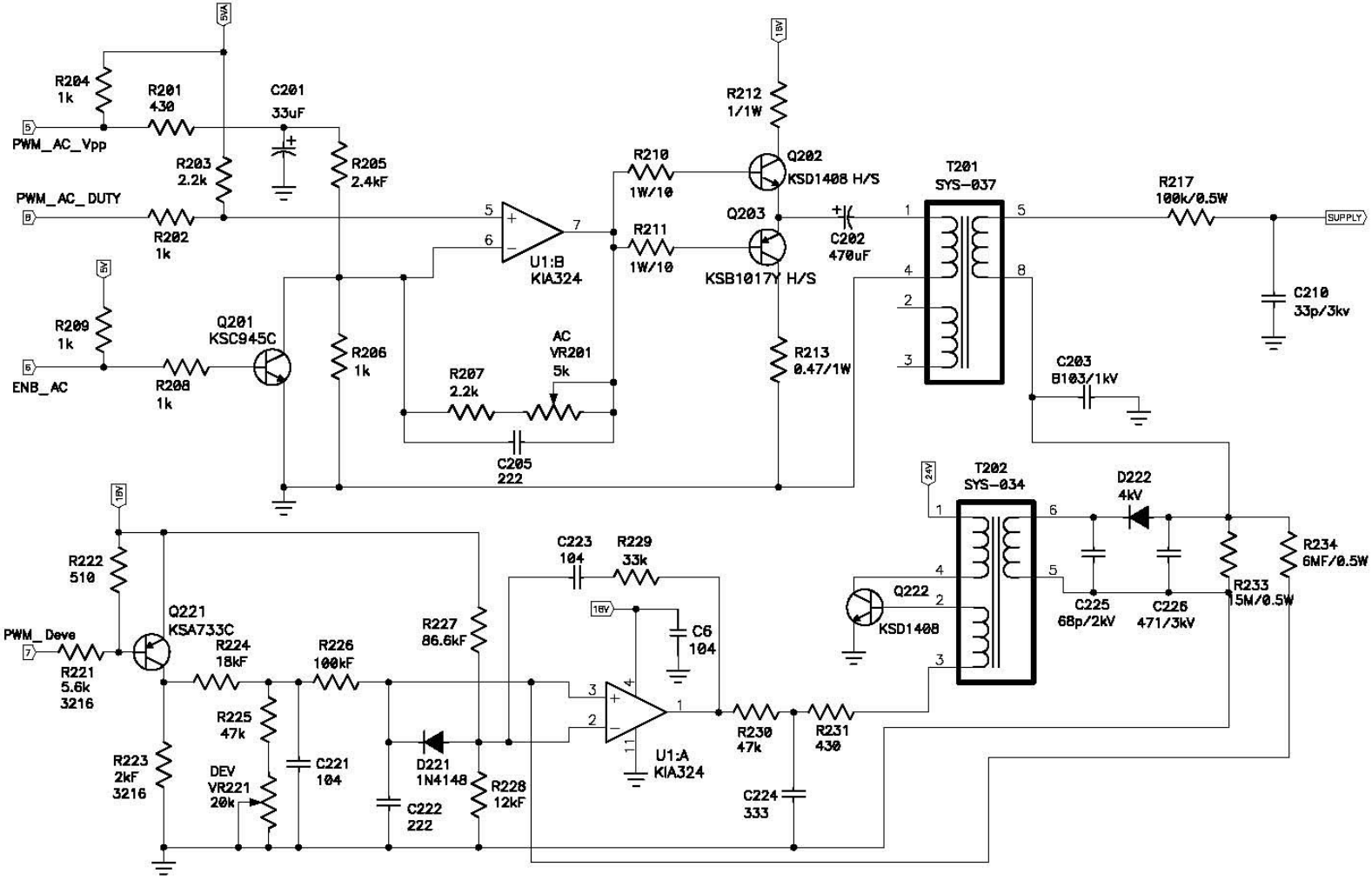
III. Schematic

HVPS (Charger)



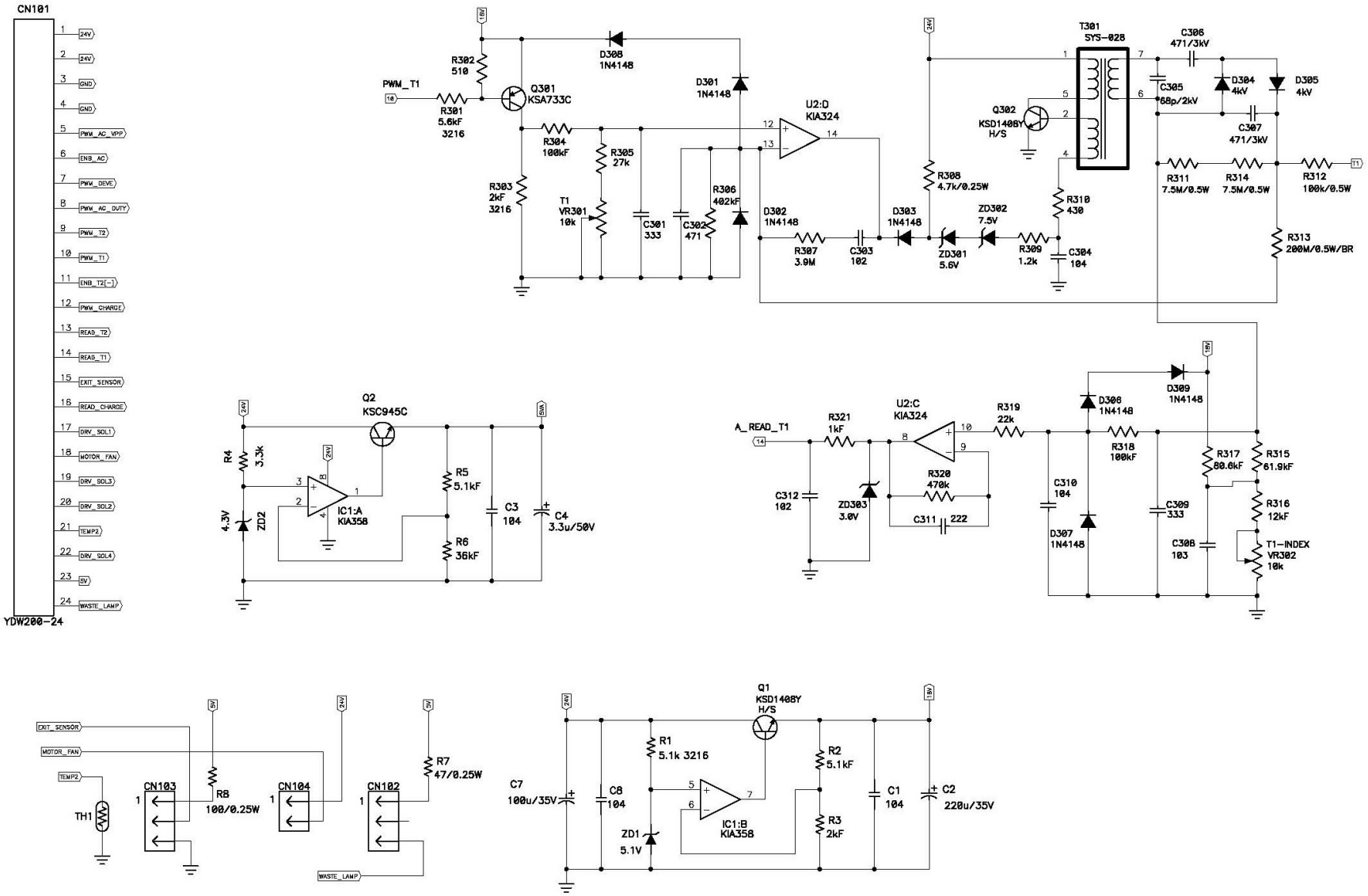
III. Schematic

HVPS (Supply)



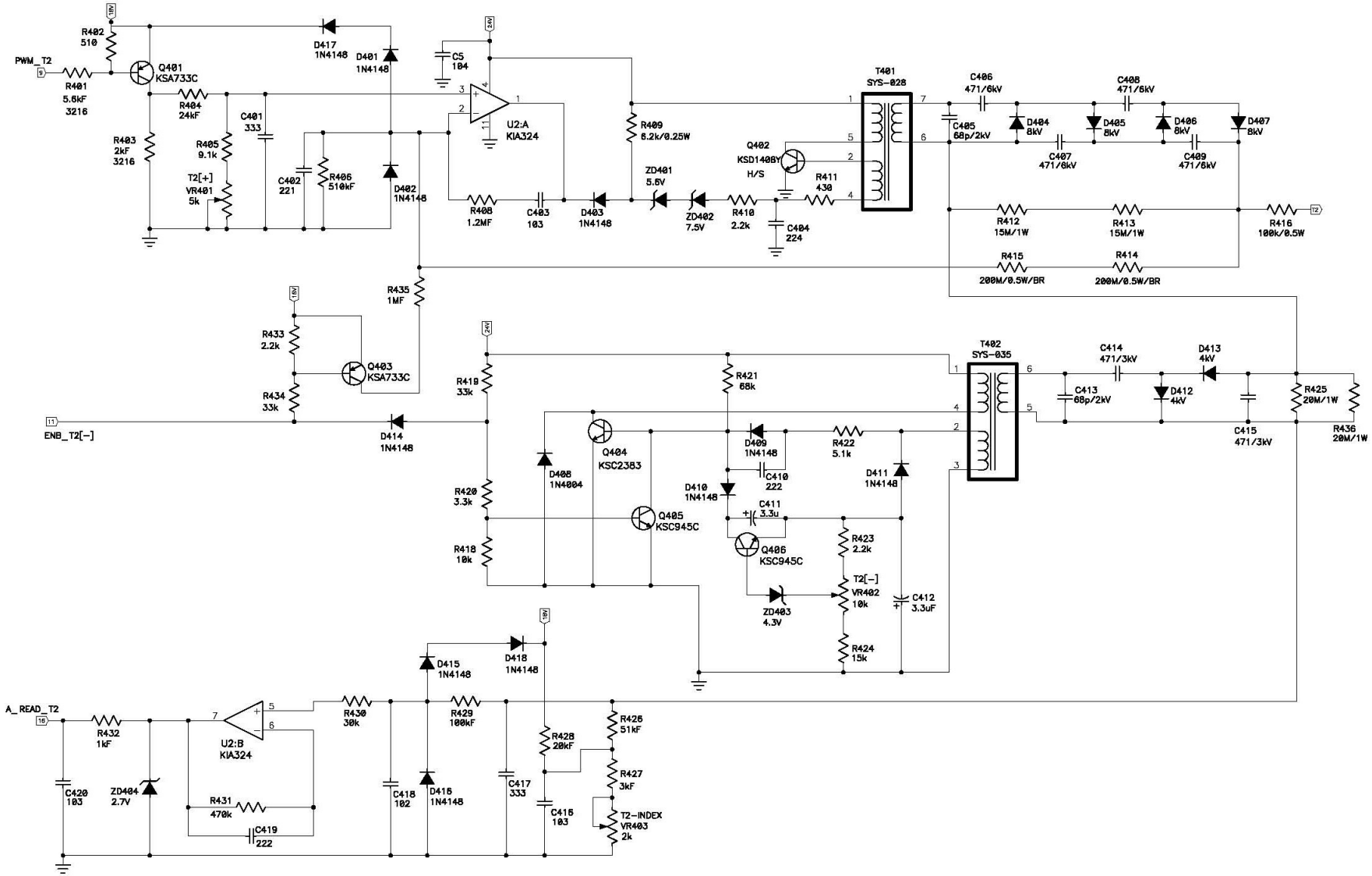
III. Schematic

HVPS (Intermediate Transfer & Reference Voltage)



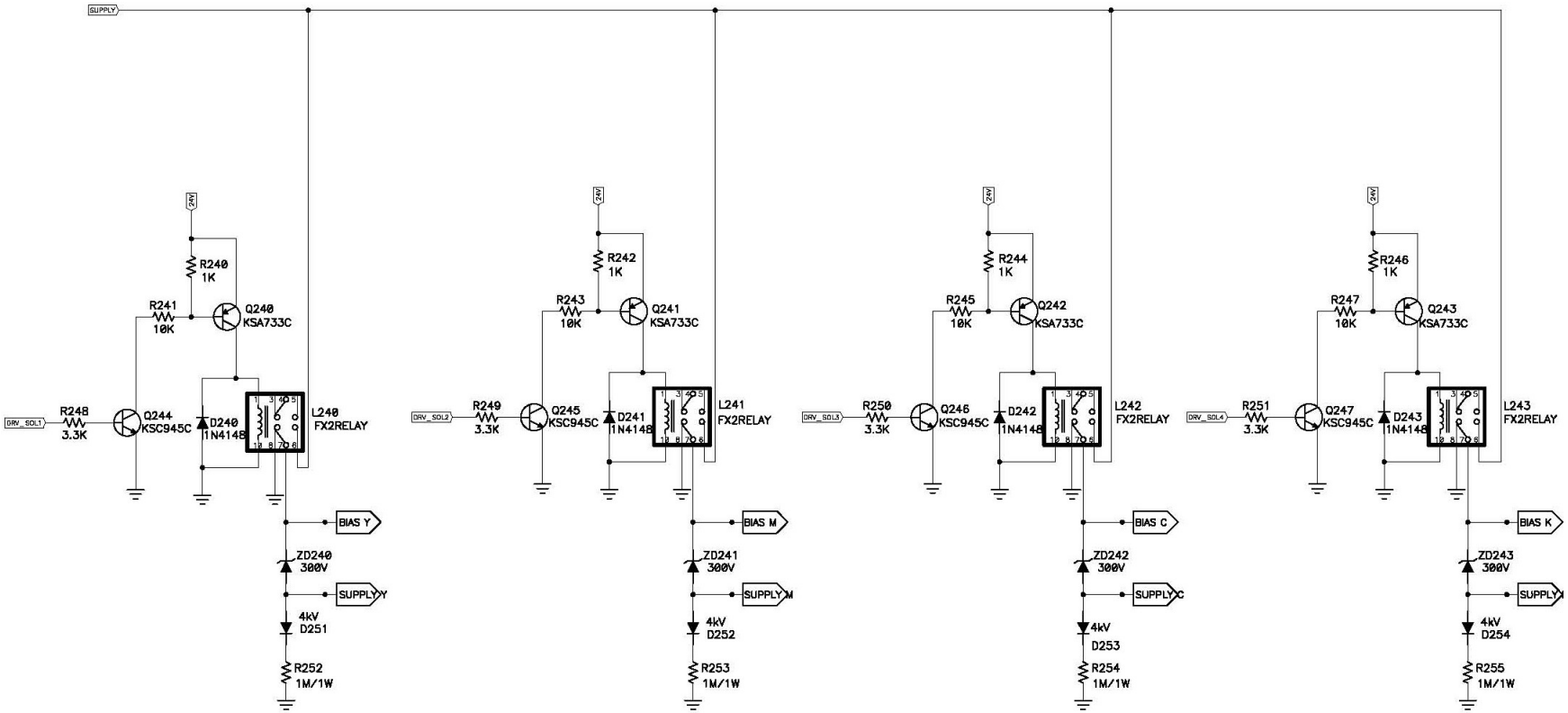
III. Schematic

HVPS (Transfer)



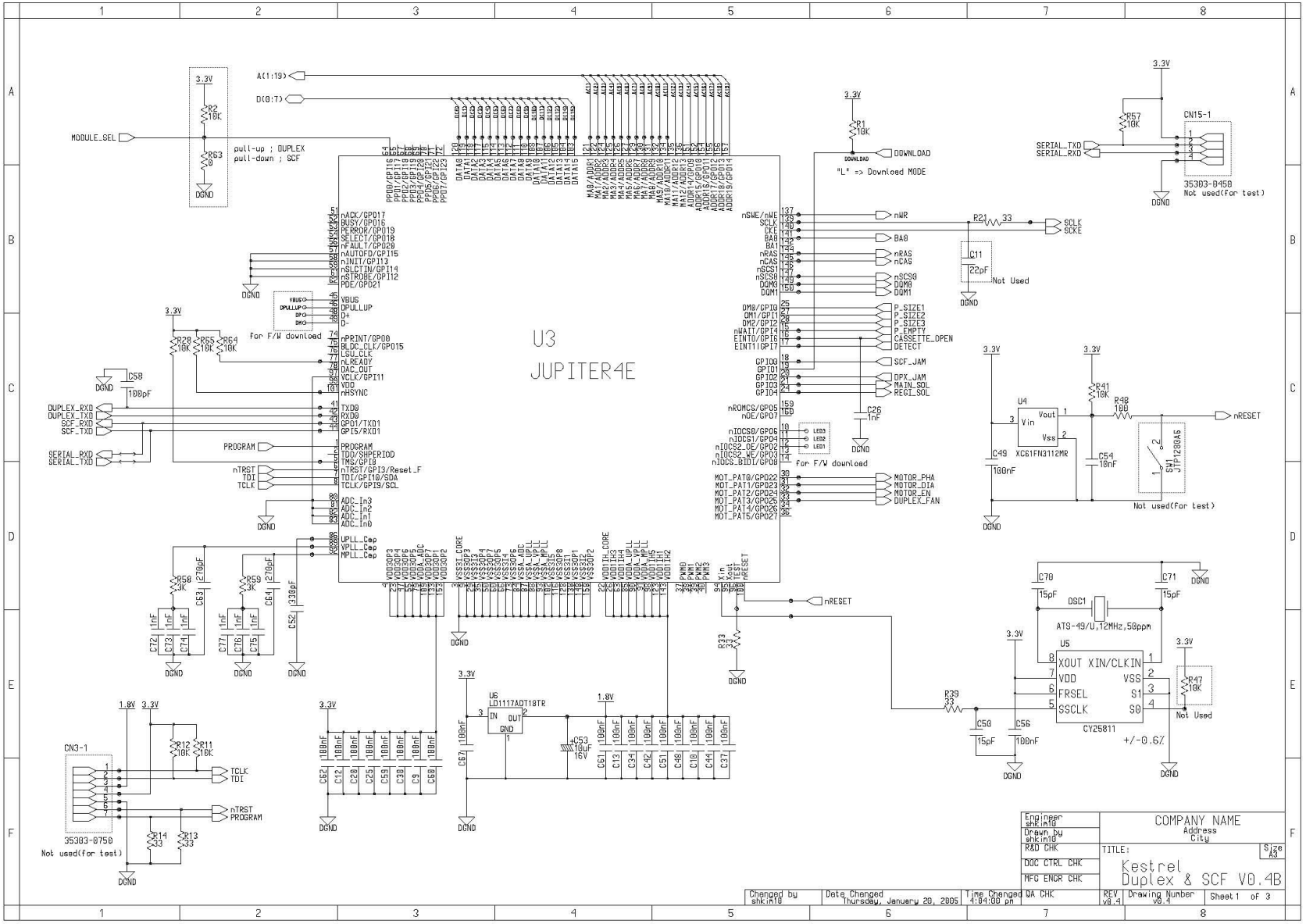
III. Schematic

HVPS (Developer High Voltage Switch)



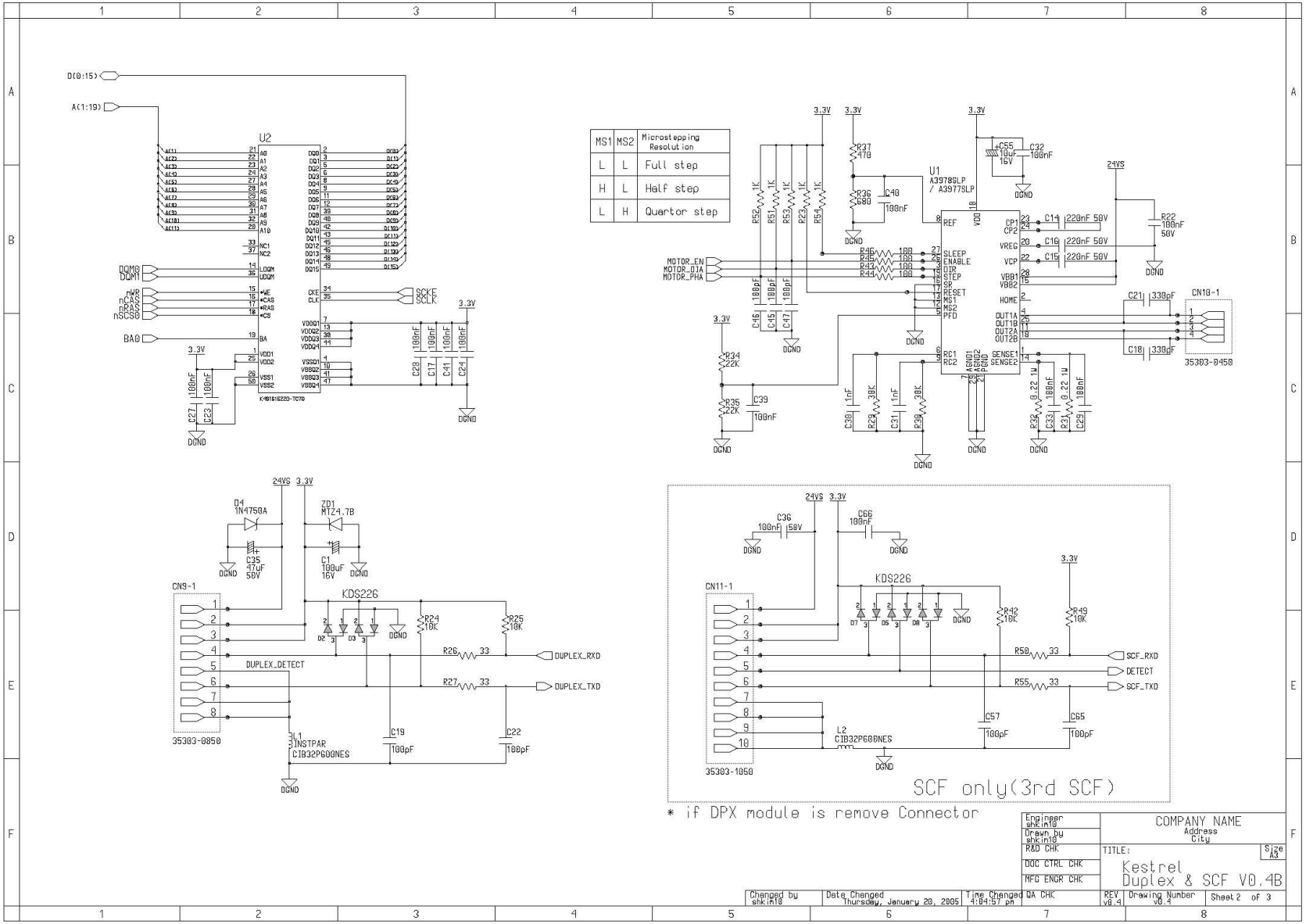
III. Schematic

SCF B'D (CPU)



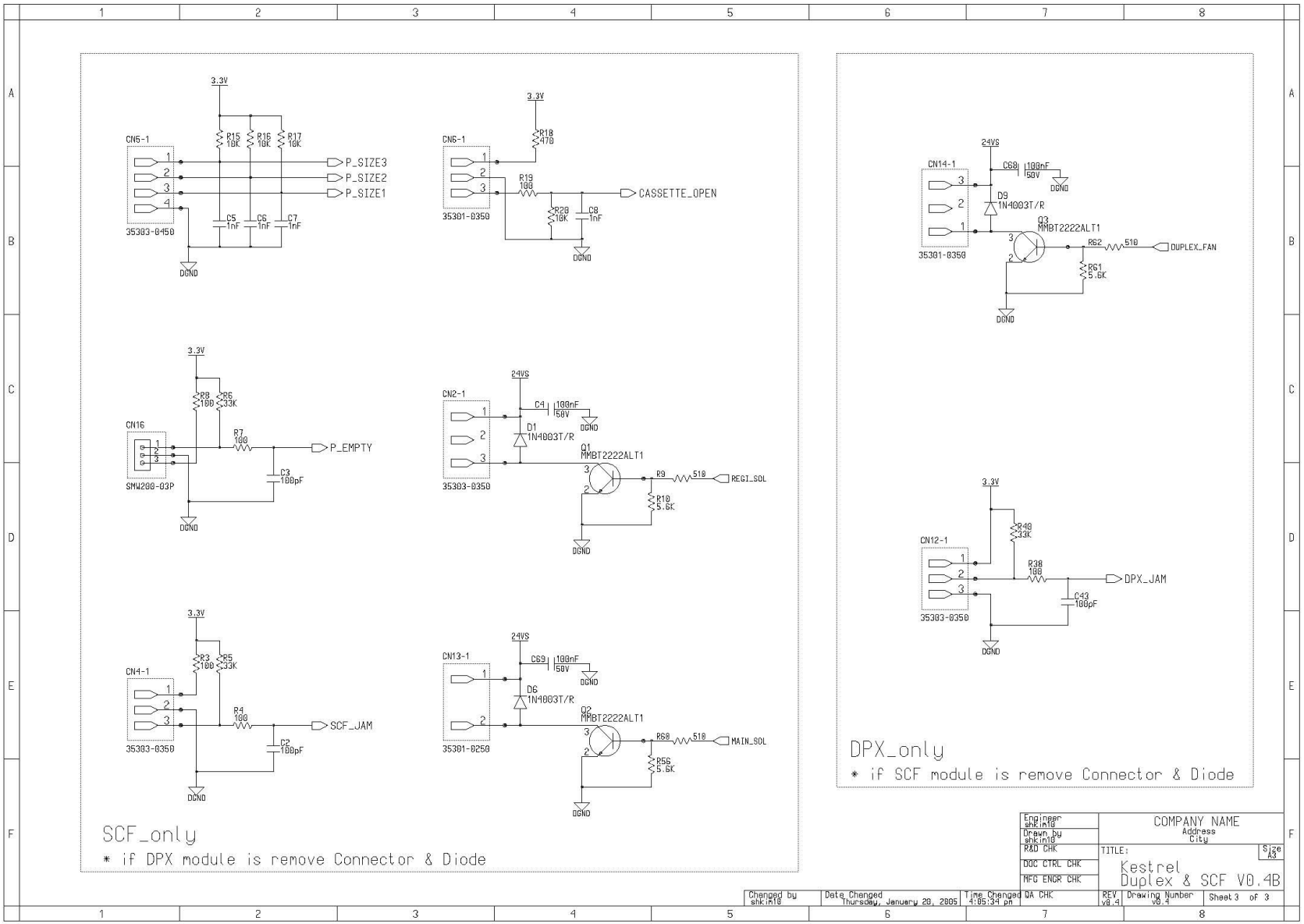
III. Schematic

SCF B'D (Memory & Motor Controller)



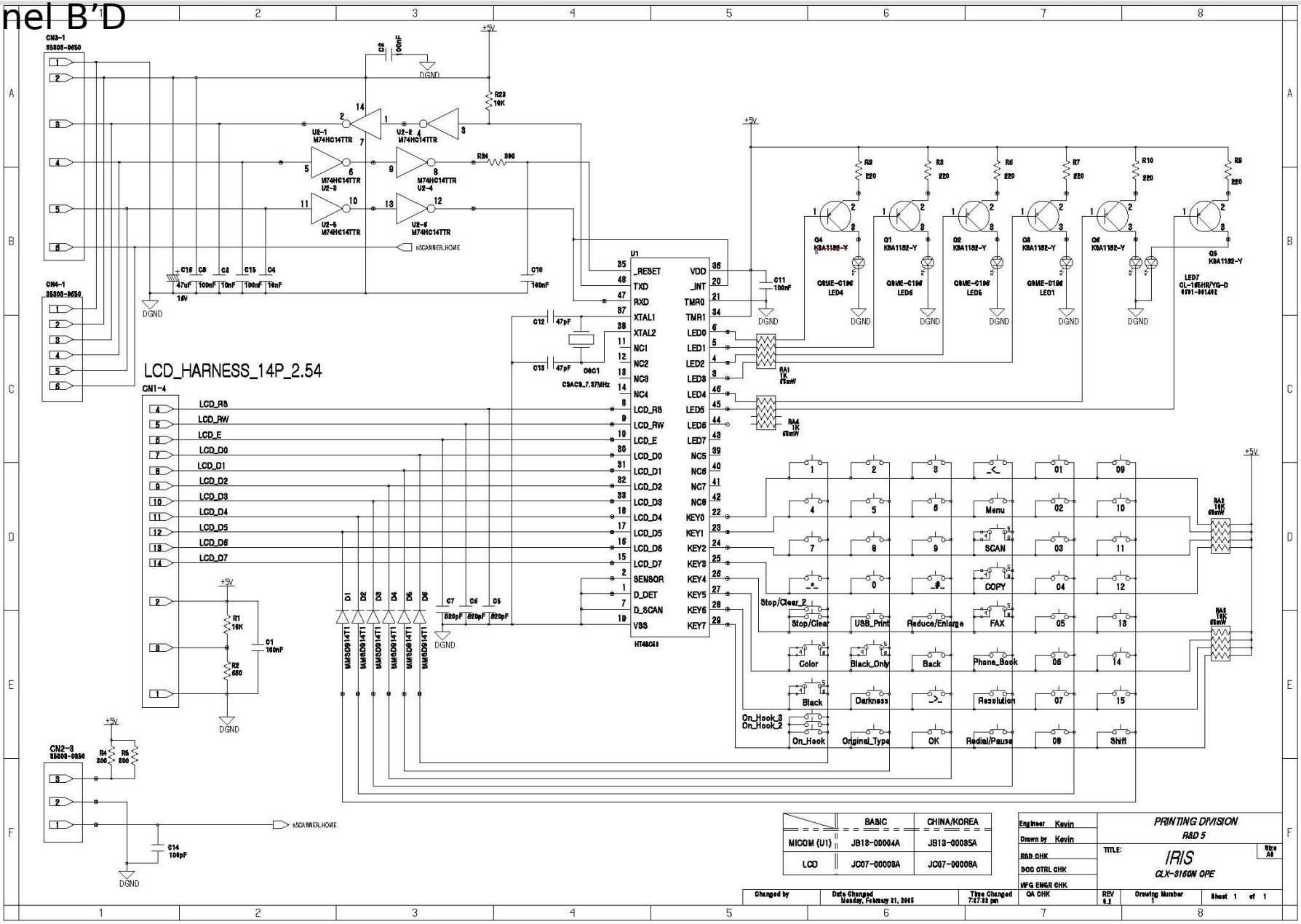
III. Schematic

SCF B'D (Sensor & Actuator Driver)



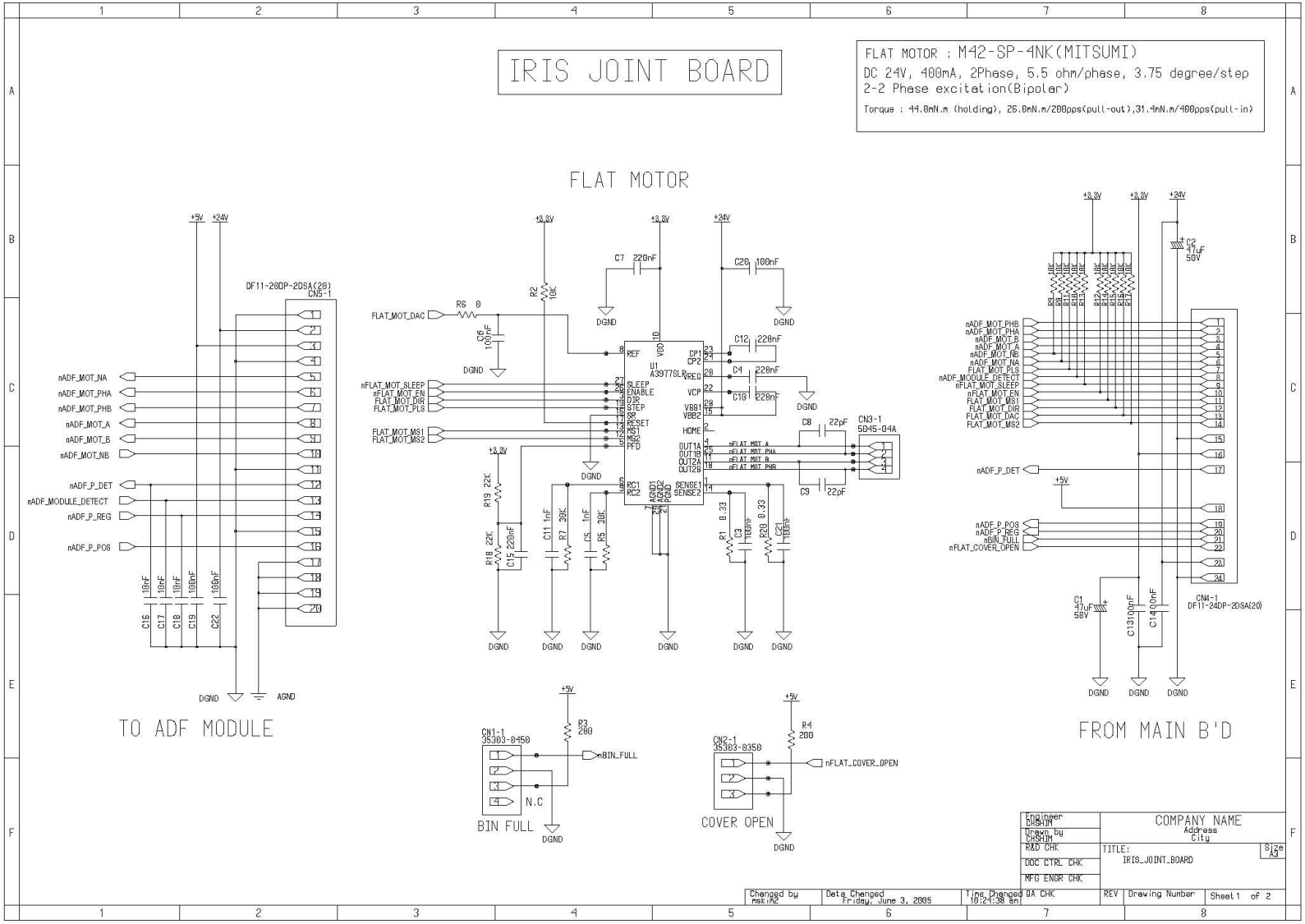
III. Schematic

Panel B'D



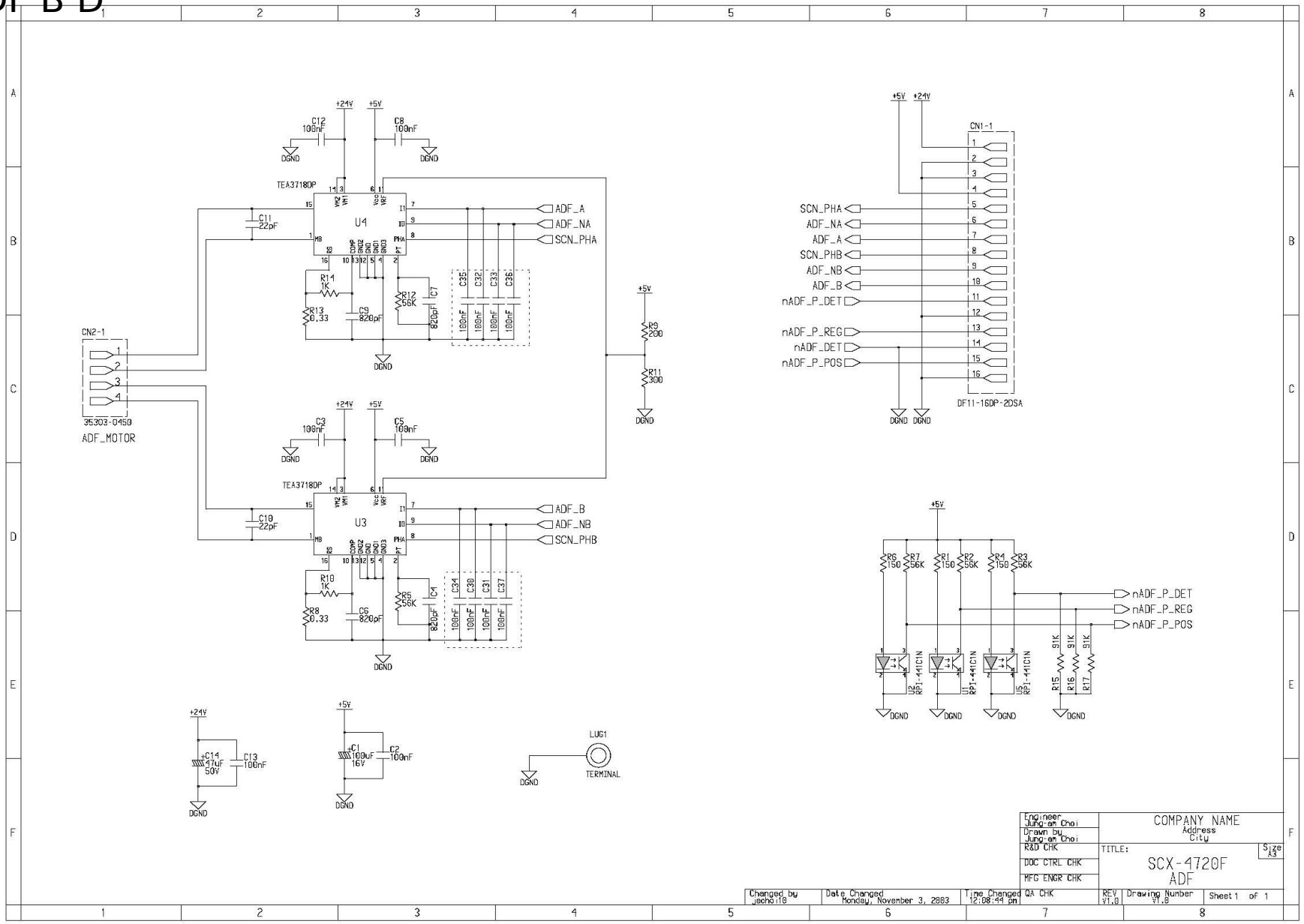
III. Schematic

Flatten Joint B'D



III. Schematic

ADF B'D



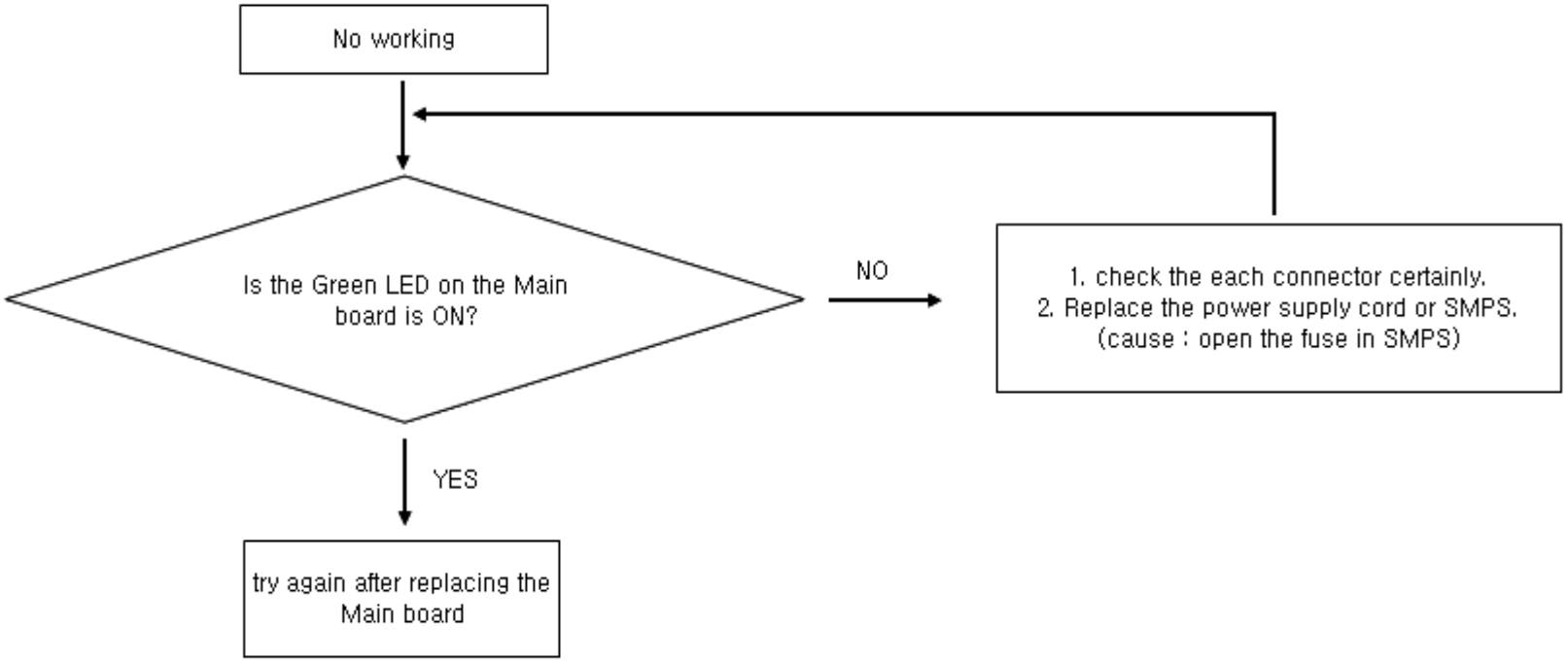
Objectives

I. To give some solutions with trouble

No Power (1)

1. no power(1)

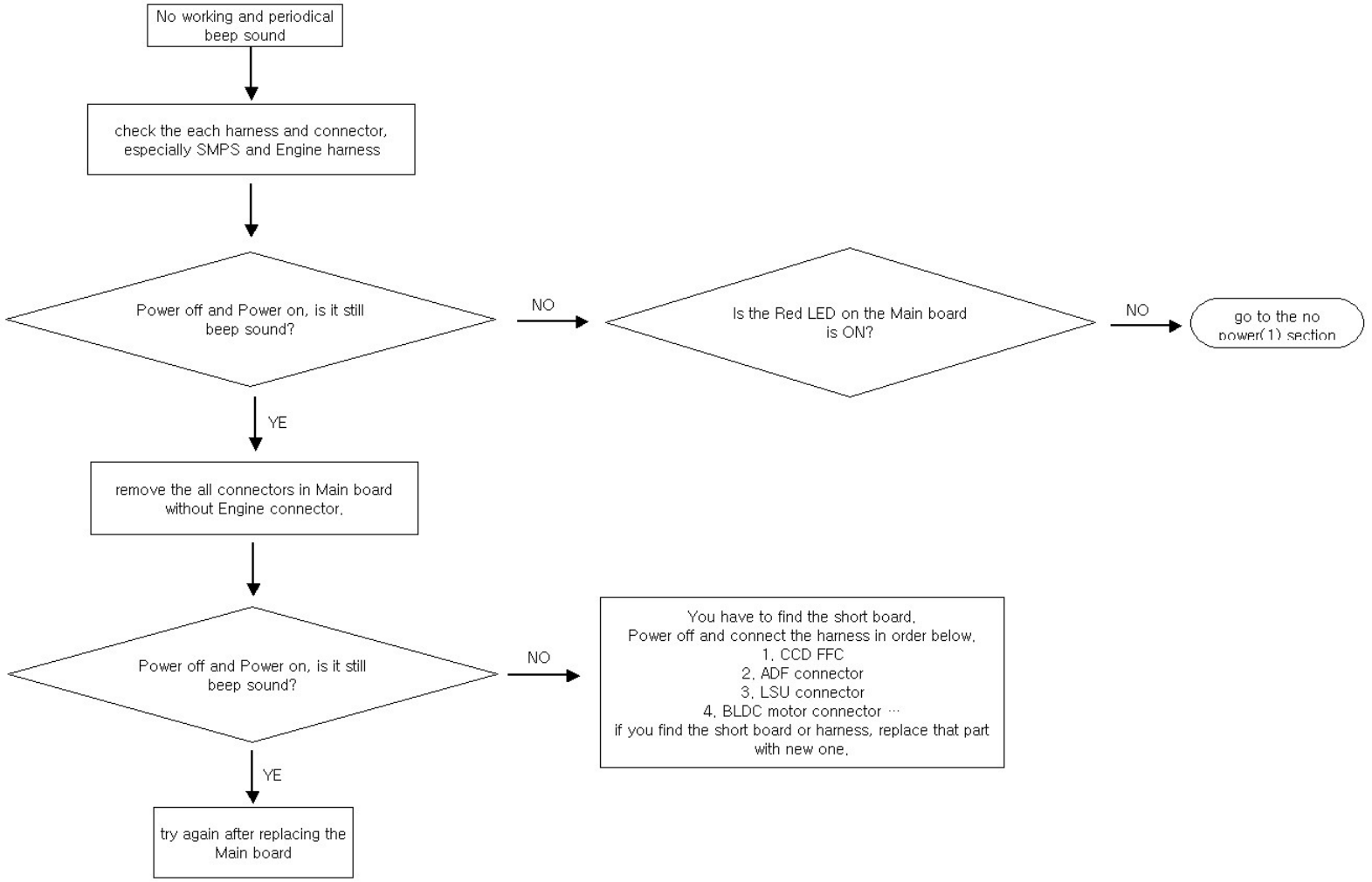
● Description : When system power is turned on, all LED on the operator panel do not come on.


No working
Is the Green LED on the Main board is ON?
NO
1. check the each connector certainly.
2. Replace the power supply cord or SMPS.
(cause : open the fuse in SMPS)
YES
try again after replacing the Main board

No Power (2)

2. no power(2)

● Description : When system power is turned on, you can hear the short beep sound continuously.


No working and periodical beep sound
check the each harness and connector, especially SMPS and Engine harness
Power off and Power on, is it still beep sound?
NO
Is the Red LED on the Main board is ON?
NO
go to the no power(1) section
YE
remove the all connectors in Main board without Engine connector.
Power off and Power on, is it still beep sound?
NO
You have to find the short board.
Power off and connect the harness in order below.
1. CCD FFC
2. ADF connector
3. LSU connector
4. BLDC motor connector ···
if you find the short board or harness, replace that part with new one.
YE
try again after replacing the Main board

LSU error

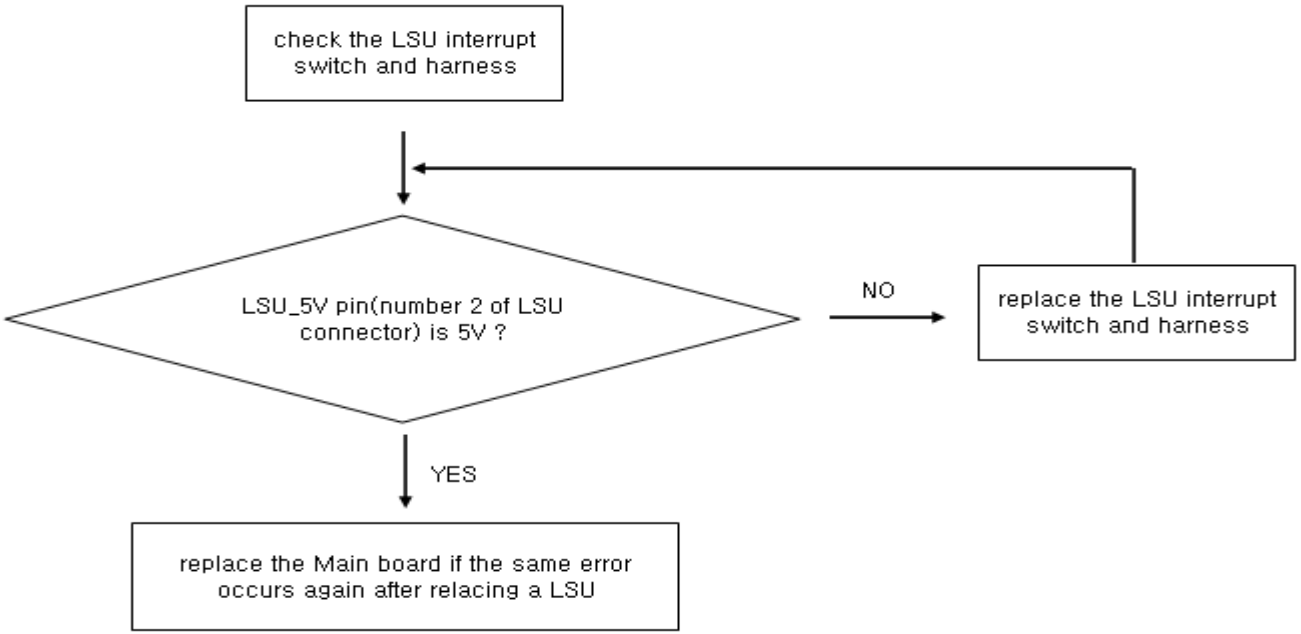
3. LSU error

● Description : A message below is displayed in a LCD panel.

LSU Motor Error
Cycle Power

LSU Hsync Error
Cycle Power

Self Diagnostics
LSU


check the LSU interrupt switch and harness
LSU_5V pin(number 2 of LSU connector) is 5V ?
NO
replace the LSU interrupt switch and harness
YES
replace the Main board if the same error occurs again after relacing a LSU

Fuser error

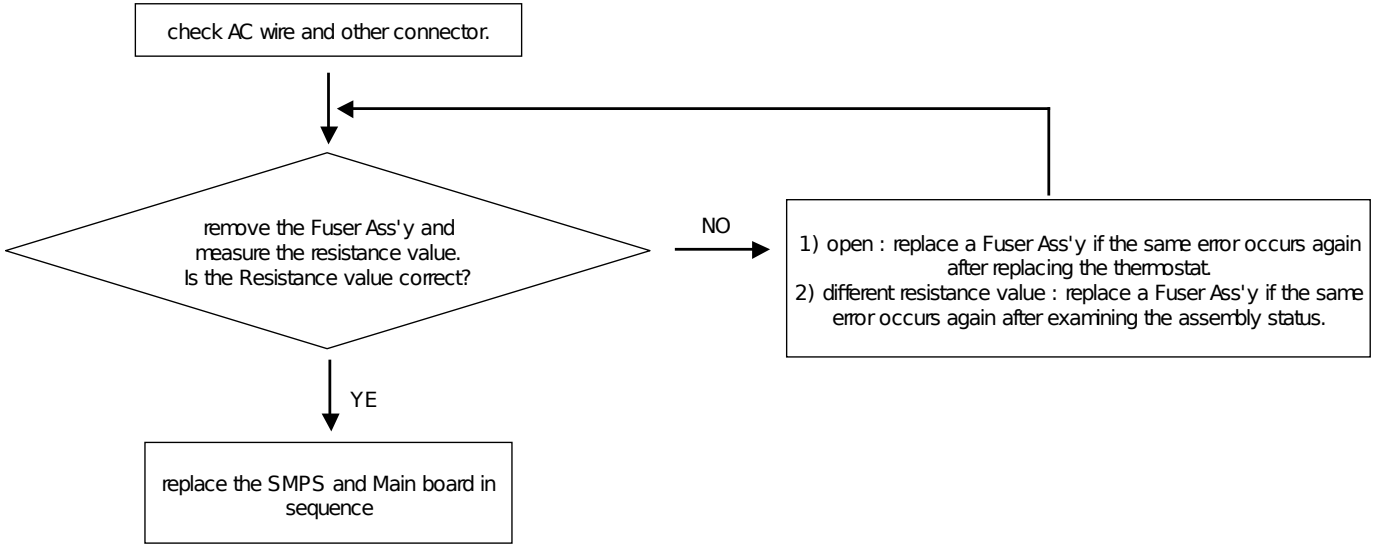
4. Fuser error

● Description : A message below is displayed in a LCD panel.

Open Heat Error
Cycle Power

Low Heat Error
Cycle Power

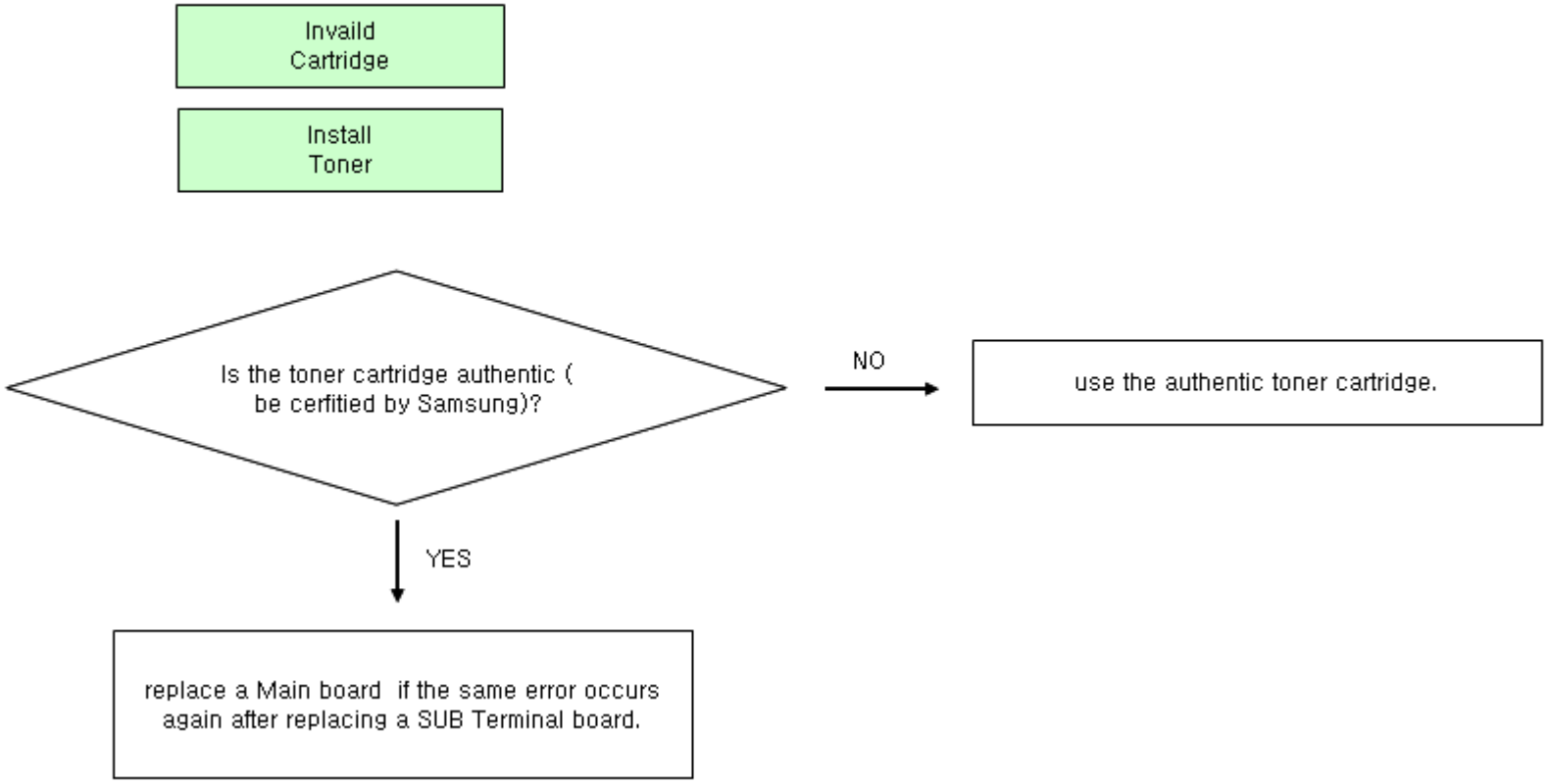
Over Heat Error
Cycle Power


check AC wire and other connector.
remove the Fuser Ass'y and measure the resistance value. Is the Resistance value correct?
NO
1) open : replace a Fuser Ass'y if the same error occurs again after replacing the thermostat.
2) different resistance value : replace a Fuser Ass'y if the same error occurs again after examining the assembly status.
YE
replace the SMPS and Main board in sequence

Toner error

6. Toner error

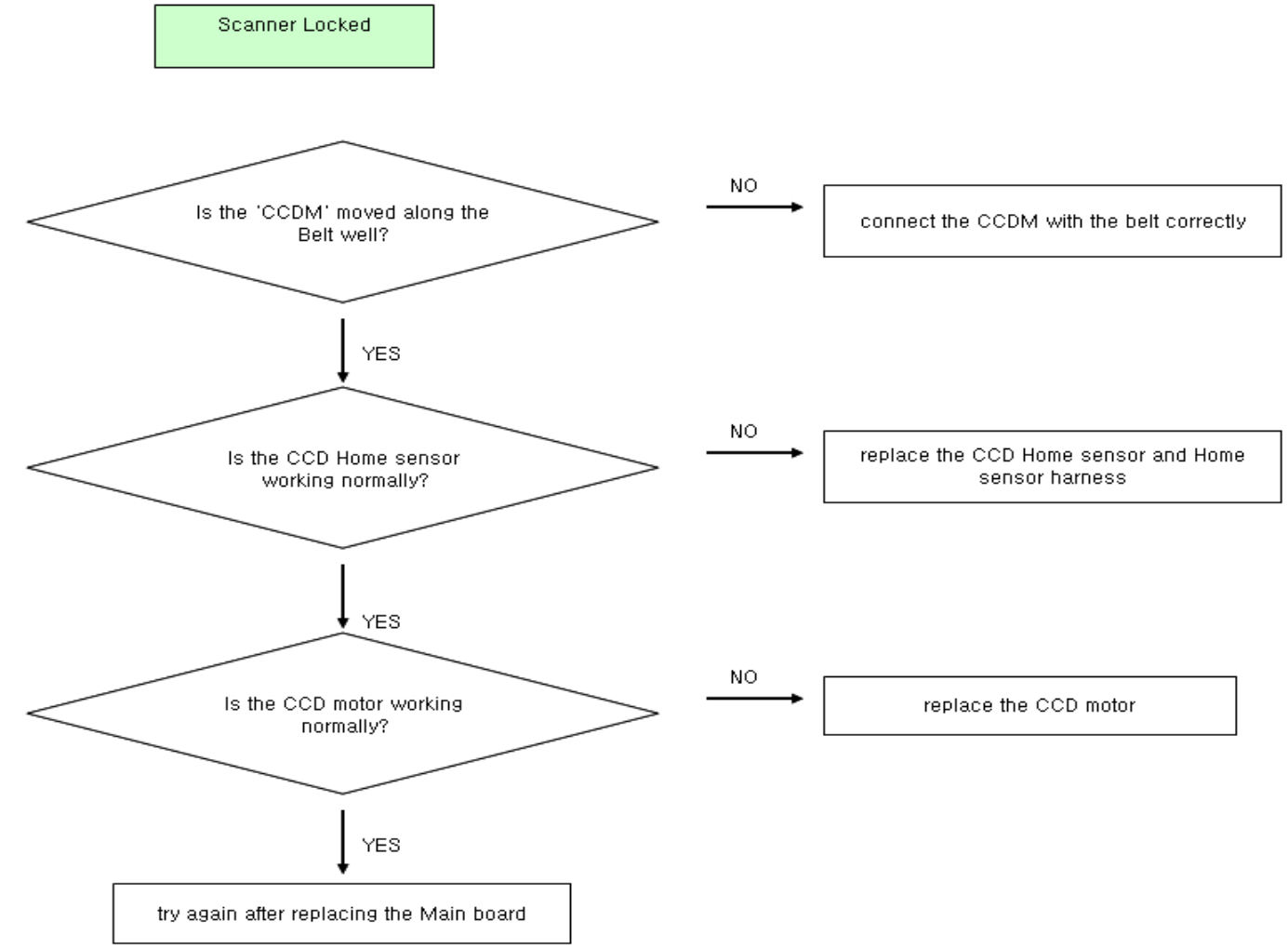
● Description : A message below is displayed in a LCD panel.



Scanner Locked

8. SCAN LOCK

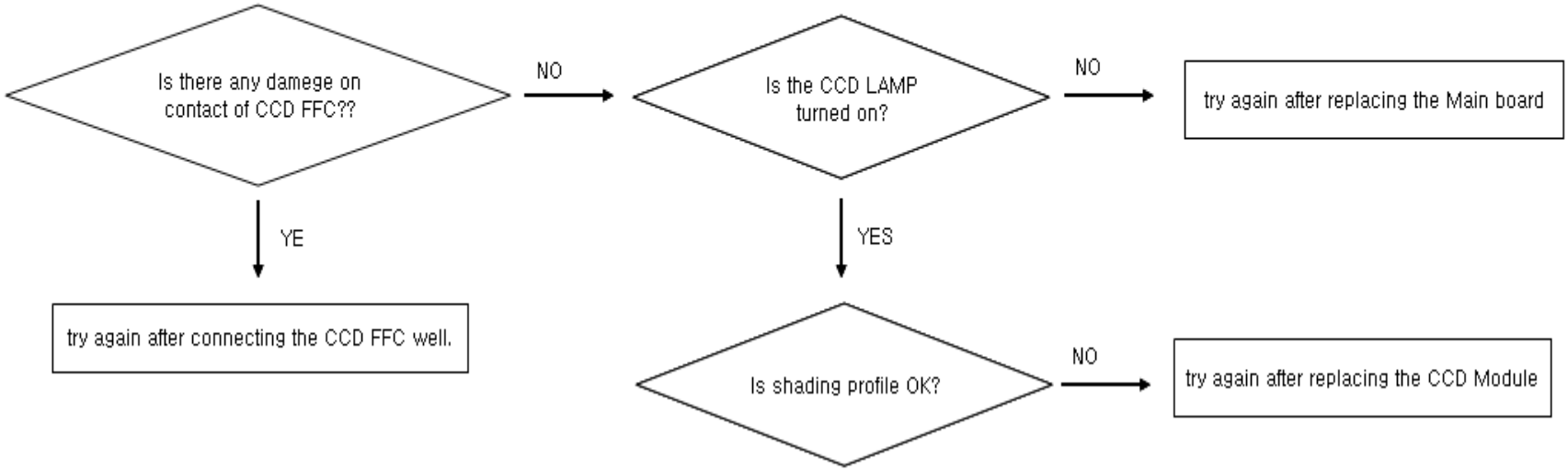
● Description : A message below is displayed in a LCD panel.


Scanner Locked
Is the 'CCDM' moved along the Belt well?
NO
connect the CCDM with the belt correctly
YES
Is the CCD Home sensor working normally?
NO
replace the CCD Home sensor and Home sensor harness
YES
Is the CCD motor working normally?
NO
replace the CCD motor
YES
try again after replacing the Main board

Copying & Scanning error

9. copying & scanning error

● Description : Blank page(black or white) is printed out when copying.


Is there any damege on contact of CCD FFC??
NO
Is the CCD LAMP turned on?
NO
try again after replacing the Main board
YE
try again after connecting the CCD FFC well.
YES
Is shading profile OK?
NO
try again after replacing the CCD Module

Review

I. Do you have any question for troubleshooting?

II. Is there anything to request for better service?

Thank you!!!